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A STUDY OF THE TRANSFER EFFECTS OF TRAINING IN LOGICAL ORGANIZATION

RACHEL SALISBURY
Milton, Wisconsin

EVERYDAY observation in the classroom discloses that pupils are handicapped in studying because of not being able to understand the continuity of what they read. Their minds grasp isolated, interesting facts, but without aid they are not able to identify important facts. Since recognizing the scheme of relationships among ideas, the logical organization, which an author sets forth in textbooks, reference books, and lectures constitutes the great bulk of studying as it is now practiced in the average American school, training designed to improve a pupil's ability to master such logical organizations should be of educational importance.

Can useful habits of thinking be so taught during school years that they will continue into (transfer to) adult life? Leaders in education like Dewey[1], Kilpatrick[2], and Judd[3] are accepting thinking habits as a legitimate goal of education. Thorndike[4] definitely declares that reading a paragraph is an exercise in reasoning. Book[5] and Loofbourow[6] report that 82 to 90 percent of all high school study consists of reading activities. Successful reading of typical textbook materials requires the ability to recognize the author's organization of ideas. Training in organization, then, should improve a fundamental skill which might be expected to transfer to a large number of school activities.

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[1]Dewey, John. *How We Think* (Boston: D. C. Heath and Company, 1933), pp. 77-78.

[2]Kilpatrick, W. H., and others. *The Educational Frontier*, New York: The Century Company, 1933.

[3]Judd, C. H. *The Psychology of Secondary Education* (Boston: Ginn and Company, 1927), Chapter XIX.

[4]Thorndike, E. L. "Reading as Reasoning," *Journal of Educational Psychology*, VIII (June, 1917), p. 329.

[5]Book, W. F. *Learning How to Study and Work Effectively* (Boston: Ginn and Company, 1928), Chapter XVII.

[6]Loofbourow, G. C. "The High School Attack upon the Problem of Study," *California Quarterly of Secondary Education*, VI (October, 1930), pp. 50-62.

Those students of education familiar with the literature on transfer of training are aware of the conflicting evidence provided by experimentation. A long history of investigation has led teacher opinion sharply away from the old faculty psychology, with its simple confidence in the disciplinary values of certain types of subject matter, into two opposing camps, one of which contends that there is no such thing as transfer of training, and the other that transfer does occur if the conditions are favorable. A study of current educational literature shows a noticeable tendency for earnest educators to inquire "What skills can be so taught that transfer *will* occur, and what are the conditions necessary?

A few early studies, either aimed directly at an answer to the last question or including in their scope some valuable evidence upon it, were made by Judd[7], Ruger[8], and Ruediger[9]. The last decade has shown an increasing number of such experiments, among which are those reported by Winch[10], Johnson[11], Meredith[12], and Woodrow[13]. A student not having time to investigate all of these studies would do well to review that made by Woodrow, who in careful laboratory work with three groups found that students who studied with a consciousness of method of learning secured much higher transfer than did pupils who merely practiced memorizing the same materials without such consciousness of method.

The following study was planned as an extension of Woodrow's findings, with certain contrasts and changes. Woodrow worked under laboratory conditions and gave the training himself; the present study was carried on in the classroom and the training was given by the regular classroom teachers. Woodrow trained to improve skill in memorizing; the present author trained to improve skill in mastery of logical

[7]Judd, C. H. "The Relation of Special Training to General Intelligence," *Educational Review*, XXXVI (1908), pp. 28-42.

[8]Ruger, H. A. "The Psychology of Efficiency," *Archives of Psychology*, XV (1910), pp. 18-19.

[9]Ruediger, W. C. *Teaching Procedures*, Boston: Houghton Mifflin Company, 1932.

[10]Winch, W. H. "The Transfer of Improvement in Reasoning in School Children," *British Journal of Psychology*, XIII (1923), pp. 370-381.

[11]Johnson, E. P. "Teaching Pupils the Conscious Use of a Technique of Thinking," *Mathematics Teacher*, XVII (April, 1924), pp. 191-201.

[12]Meredith, G. P. "Consciousness of Method as a Means of Transfer of Training," *Forum of Education*, V (1927), pp. 37-45.

[13]Woodrow, Herbert. "The Effect of Type of Training upon Transference," *Journal of Educational Psychology*, XVIII (March, 1927), pp. 159-178.

organization by means of outlining and summarizing. Both memorizing and organizing are learning skills — study habits — commonly required in the public schools. Woodrow used three groups — a control group, a practice group, and a training group. The present study used only the first and last, it being found that few high school pupils have any outlining habits to practice. Other differences in experimental technique necessitated by the shift from laboratory to classroom will be apparent to any reader of the two studies.

THE PROBLEM

In the present study data were gathered to show whether such a fundamental study habit as outlining, if taught as a conscious method of analyzing thought and of organizing data for specific purposes, would produce changes in pupil learning habits that would transfer to specific school situations or to general thinking situations. The problem may be stated in detail thus:

First, what effect, if any, does training in logical organization (thought analysis and synthesis) as practiced through the medium of outlines and summaries, have upon high school pupils as measured by changes in: (1) intelligence scores, (2) mental age, (3) reading comprehension, (4) reading rate, (5) reasoning, and (6) performance in some similar study situation where transfer of training might be expected to occur?

Second, is such training most effective in the 7th, 9th, or 12th grade?

Third, does such training operate better when conducted intensively (daily) for six weeks, or when scattered intermittently through a semester, with lessons only twice a week?

THE EXPERIMENTAL PROCEDURE

The experiment[14], which was conducted in English classes in four typical midwestern high schools during the fall semester of 1933, involved 474 pupils. Two of the four experiments were conducted at the 9th grade level, one at the 7th, and one at the 12th. In each grade there were approximately as many boys as girls. The equivalent-groups method of procedure was used, the equating being done after the experiment by means of matched pairs.

[14]For valuable counsel during the entire period of this study, the author is deeply indebted to Dr. V. A. C. Henmon, Dr. A. S. Barr, and Dr. M. H. Willing, of the University of Wisconsin.

At the beginning of the experimental period in each of the four schools, all pupils included in the study were given a series of tests, after which approximately half of the pupils (the experimental group) were given special training, while the others (the control group) were not. While the experimental pupils studied 30 specially prepared lessons the control pupils had 30 lessons in materials from the regular English curriculum, the subject-matter of the two groups being entirely different. At the end of the experimental period all of the pupils again took the series of tests. All pupils worked *unwissentlich*, supposing that the testing and training were a regular part of their English work.

After the experiment the groups were equated by matching a control pupil against an experimental pupil of equal initial ability. The pupils were matched by intelligence quotient, by mental age, and by score on the *Haggerty Reading Examination, Sigma 3.* Since there were nearly twice as many control as experimental pupils it was possible to do the equating separately on each of these three bases. Of several available control pupils with identical I Q's, that pupil was chosen as a match whose M A most nearly equalled that of the experimental pupil; and of several equal M A's available within an I Q group, that pupil was selected whose reading score was nearest that of the experimental pupil being matched. A total of 150 closely matched pairs was thus secured.

In each school, at the beginning of the experimental period, the following standardized tests were given: *Terman Group Test of Mental Ability, Haggerty Reading Examination, Sigma 3,* the *Burt Graded Reasoning Test,* and an achievement test in a transfer subject (*Iowa General Information Test in American History, Brown-Woody Civics Test,* and *Analytical Scales of Attainment* in general science). The standardized tests were built for use in all three of the grades included in this study. In addition, the experimenter provided a separate measure of reading rate, consisting of two selections of approximately 1600 words each. These selections were read on different days by the pupils, who recorded individual beginning and finishing times on their papers by glancing at the blackboard, where the experimenter recorded the minutes successively. The total number of minutes required for reading was used as an index of the pupil's reading rate. At the end of the experimental period, the entire testing program was repeated with the use of alternate forms where possible.

All of the pupils involved in the experiment were taking some content subject, (civics, history, or general science) in which no training in organization was given to either control or experimental pupils but which provided opportunity for transfer of training by the experimental pupils if such transfer were to occur. From time to time, when developing a principle of outlining or summarizing, the experimental teacher suggested that its application to general reading or in such classes as history, science, or civics might prove useful; but no definite assignments to other subjects were ever made. Therefore, any application of the principles of outlining to the subject matter of the transfer classes was purely voluntary or unconscious on the pupil's part. Within each school unit the teaching of each transfer subject was practically uniform for both experimental and control pupils, who were scattered miscellaneously through the transfer sections.

Neither group was given practice in the exact type of work required in any of the tests. The training contained no exercises similar to those in the intelligence, reading, or reasoning tests, and did not give practice in the analysis of any unit of history, civics, or science. Any improvement in these measured abilities must be due not to the transfer of specific data but to the transfer of a principle of study or thinking, of improved skill in grasping the relations among ideas—skills developed in this investigation through practice in outlining and summarizing. The use of tests that contain materials entirely foreign to the training corresponds to the plan used by Woodrow in his experiment with memory.

In order to prevent any unconscious teacher-carry-over of thinking or teaching technique, the control and experimental sections were in all cases but one taught by different teachers. While one teacher was carefully following the experimental program with the training section, another teacher was working on literature with the control section. The control and transfer teachers agreed to require no outlining or summarizing during the experimental period. None of the teachers was previously acquainted with either the training technique or the materials.

MATERIALS OF TRAINING

The training materials consisted of 30 carefully prepared lessons in outlining and summarizing all of which had been previously tried out with 16 ninth grade pupils representing a sample range of intelligence. During this preliminary experiment the lessons were adjusted

as to difficulty, length, and psychological progression by easy steps insuring mastery for all. A Teacher's Guide, with specific daily suggestions, prepared and given to each of the four experimental teachers, insured a minimum of teacher variability. The teacher factor tended further to constancy because the 30 lessons were completely objective and self-explanatory.

The materials of training consisted of selections for outlining and summarizing taken at random from the typical study materials of high school subjects. Although the training was given in the English classes, the subject-matter was not the usual subject-matter of the English curriculum. The method was, however, definitely the method of English composition — analysis of things read for the purpose of using them with personal experience to make a new synthesis of ideas to suit an individual purpose in oral or written composition. The purpose of the training was to develop skill in recognizing and making logical organizations (outlining as a method of study) by the use of miscellaneous materials; and to determine by measurement whether this ideal (or consciousness), developed through such general materials, would transfer to the specific, unfamiliar, subject-matter situations of other courses. In this respect this study differed from experiments made by Barton[15], Butterweck[16], Newlun[17], Holmes[18], and Jacobsen[19], where both control and experimental groups studied the same subject matter by different methods.

At every point the thinking side of outlining was stressed in the training. Pupils were shown that expressions like *First, Second, a), b), c),* etc. (called full signals) identified what the author considered his main points. These topics were then written down in order, with logical symbols to indicate their place in an outline. Then followed practice in recognizing such transition expressions as *one, another, furthermore, then, finally,* etc., (called half signals), which may join a group of main

[15]Barton, W. A. *Outlining as a Study Procedure,* Contributions to Education, No. 411, New York: Bureau of Publications, Teachers College, Columbia University, 1930.

[16]Butterweck, J. S. *The Problem of Teaching High School Pupils How to Study,* Contributions to Education, No. 273, New York: Bureau of Publications, Teachers College, Columbia University, 1926.

[17]Newlun, Chester O. *Teaching Children to Summarize in Fifth Grade History,* Contributions to Education, No. 404, New York: Bureau of Publications, Teachers College, Columbia University, 1930.

[18]Holmes, Eleanor. "Reading Guided by Questions versus Careful Reading without Questions," *School Review,* XXXI (May, 1931), pp. 361-371.

[19]Jacobsen, P. B. "The Effect of Work-type Reading Instruction Given in the Ninth Grade," *School Review,* XL (April, 1932), pp. 273-281.

topics or a group of subtopics. Finally, practice in recognizing "the next step in the thought," without the aid of signals, was given; and the pupils were taught to convert outlines into summaries and to make summaries directly from the subject-matter read. At each stage, analysis of the written thought came first, and the mechanical making of the outline or of the summary followed merely as objective evidence of the pupil's command of the relationships existing among the ideas studied. A limited amount of practice in making original outlines for compositions was also given.[20]

STATISTICAL TREATMENT

Gains made by the control pupils, who had no formal training in logical organization, may be due to the practice effect of the tests, to maturation, and (or) to the influence of such incidental training in organization as is inherent in the school program as a whole. The experimental pupils were equally exposed to these influences and, in addition, to a period of definite training in the principles of organization. In order to arrive at a measure of the effects of the training itself upon the experimental pupils, it therefore becomes necessary to subtract from the total improvement made by the experimental pupils such improvement as was made by the corresponding control pupils during the same period of time. This subtraction of the effects of influences common to both groups leaves a residuum of improvement in the experimental groups which is held to be the true measure of the effect of the variable. In this report, the expression *net gain* is used to represent this residuum. The significance of such gains was found by dividing the mean net gain for any one group on any one test by the standard error of that gain. The resulting critical ratio constitutes a numerical value comparable with that obtained by Woodrow. To interpret the data statistically the method of mean differences advocated by Student[21], Ezekiel[22], and Fisher[23] was used.

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[20] All of the 30 lessons used are included in *Better Work Habits*, by Rachel Salisbury, published by Scott, Foresman and Company, Chicago.

[21] "The Probable Error of a Mean," *Biometrika*, VI (1908), pp. 1-25.

[22] Ezekiel, Mordecai. "Student's Method for Measuring the Significance of a Difference between Matched Groups," *Journal of Educational Psychology*, XXIII (September, 1932), pp. 448-450.

[23] Fisher, R. A. *Statistical Methods for Research Workers*, London: Oliver and Boyd, 1928.

SUMMARY OF THE DATA

The mean scores on the initial tests and on the final tests for each of the four schools are summarized in Table I. In School A (12th grade)

TABLE I

TABLE OF INITIAL AND FINAL SCORES FOR EXPERIMENTAL (EX) AND CONTROL (CT) PUPILS IN THE FOUR SCHOOLS INVOLVED

INITIAL MEAN SCORES

School N		A—12th 28—6 wks. Mean	S. E.	B—9th 64—6 wks. Mean	S. E.	C—9th 38—1 sem. Mean	S. E.	D—7th 20—1 sem. Mean	S. E.
Ex	I Q	103.6	1.7	105.2	1.5	101.2	1.8	100.5	2.9
Ct	I Q	103.7	1.6	105.1	1.5	101.2	1.8	100.6	2.5
Ex	M A	198.6	3.1	182.5	2.1	173.3	2.7	152.2	3.4
Ct	M A	199.0	3.1	182.6	2.0	174.5	2.8	151.7	2.4
Ex	Reading Score	89.8	3.8	80.5	2.0	76.9	2.4	53.4	4.5
Ct	Reading Score	92.5	3.3	79.0	2.0	76.7	2.7	53.3	3.2
Ex	Reading Rate	18.3	.6	19.1	.6	21.6	1.1	19.9	1.4
Ct	Reading Rate	16.9	.6	20.9	.3	20.8	.7	21.4	1.4
Ex	Reasoning	12.9	.5	8.1	.3	10.4	.3	6.9	.7
Ct	Reasoning	12.6	.5	9.9	.3	9.8	.5	7.5	.5
Ex	Transfer†	H17.3	1.0	C80.1	2.2	C88.3*	2.9	H8.7	1.1
Ct	Transfer	H16.8	1.0	C76.0	2.2	C95.3	3.0	H11.0	1.2
Ex	Transfer†					S66.0*	3.4		
Ct	Transfer					S58.2	3.5		

FINAL MEAN SCORES

School N		A—12th 28—6 wks. Mean	S. E.	B—9th 64—6 wks. Mean	S. E.	C—9th 38—1 sem. Mean	S. E.	D—7th 20—1 sem Mean	S. E.
Ex	I Q	106.0	1.6	107.8	1.2	104.5	1.8	103.4	2.8
Ct	I Q	103.6	1.7	105.5	1.6	105.4	1.9	102.4	2.3
Ex	M A	203.2	3.4	189.0	1.6	184.2	2.9	161.5	3.2
Ct	M A	199.0	3.2	187.4	2.1	186.5	3.1	159.5	2.4
Ex	Reading Score	102.2	3.3	90.8	1.9	86.6	2.4	69.1	4.4
Ct	Reading Score	93.5	3.0	78.1	2.0	77.4	3.3	54.4	3.3
Ex	Reading Rate	18.4	.8	18.3	.6	20.5	1.1	20.4	1.2
Ct	Reading Rate	14.5	.7	18.5	.6	17.7	.6	19.4	1.2
Ex	Reasoning	16.0	.5	10.5	.4	14.8	.5	11.6	.7
Ct	Reasoning	13.2	.6	10.1	.5	12.8	.5	10.6	.6
Ex	Transfer†	H35.0	1.8	C92.5	1.9	C107.1*	3.8	H18.3	1.7
Ct	Transfer	H28.7	1.6	C81.8	1.9	C107.3	2.2	H15.2	1.7
Ex	Transfer†					S84.3*	3.4		
Ct	Transfer					S73.3	2.9		

†H = History C = Civics S = Science
*17 matched pairs

there were 28 matched pairs; in School B (9th grade), 64 matched pairs; in School C (9th grade), 38 matched pairs; and in School D (7th grade), 20 matched pairs. In the case of each test, the figures represent in turn mean intelligence quotient, mean months of mental age, mean score on the *Haggerty Reading Examination, Sigma 3,*

mean reading rate in minutes, mean number of reading problems solved, and mean achievement score on a test in the transfer subject.

Initial mean scores, grouped in the upper half of the table, show a remarkable uniformity of initial ability on all of the measured factors. Seventh grade pupils naturally made lowest scores and 12th grade pupils highest. In the case of School C, part of the 9th grade pupils were taking civics and part were taking general science. Therefore the 38 matched pairs had to be re-matched into sub-groups of 17 matched pairs each, one for civics and one for science. Resulting increases of standard error make these results less reliable than other scores.

Final mean scores, grouped in the lower half of Table I, are most interesting in terms of gains on the several tests, as presented in Table II. For each measured factor in each school, Table II shows the mean gain made by the experimental group, the mean gain made by the corresponding control group, and the difference between them—which represents the net gain made by the experimental group as a result of the variable. In those cases where this net gain is three

TABLE II

TABLE OF MEAN GAINS MADE BY EXPERIMENTAL (EX) AND CONTROL (CT) GROUPS IN FOUR SCHOOLS

School	A		B		C		D	
Grade	12th		9th		9th		7th	
Number of Pairs	28		64		38		20	
Time Limits	6 wks.		6 wks.		1 sem.		1 sem.	
	Gain	S. E.	Gain	S. E.	Gain	S. E.	Gain	S. E.
Ex I Q	2.4		2.6		3.3		2.9	
Ct I Q	− .1		1.4		4.2		1.8	
Net Gain	2.5	1.2	1.2	.8	− .9	1.0	.9	1.9
Ex Mental age	4.6		6.5		10.9		9.3	
Ct Mental age	.0		4.8		12.0		7.7	
Net Gain	4.6	2.3	1.7	1.4	−1.1	1.8	1.6	2.9
Ex Reading score	12.3		10.3		9.7		15.7	
Ct Reading score	1.0		− .9		.7		1.1	
Net Gain	11.3	1.7	11.2	1.8	9.0	1.8	14.6	3.1
Ex Reading rate	.1		− .8		−1.1		.5	
Ct Reading rate	−2.4		−2.3		−3.2		−2.0	
Net Gain	2.5	.9	1.5	.6	2.1	1.0	2.5	2.0
Ex Reasoning	3.1		2.4		4.4		4.9	
Ct Reasoning	.6		.2		3.0		3.1	
Net Gain	2.5	.7	2.2	.4	1.4	.6	1.8	.9
Ex Transfer	H17.7		C12.4		C18.8*		H9.6	
Ct Transfer	H11.9		C 5.8		C11.4		H4.1	
Net Gain	H 5.8	1.9	C 6.6	2.0	C 7.4	3.0	H5.5	1.1
Ex Transfer					S18.3*			
Ct Transfer					S15.1			
Net Gain					S 3.2	2.0		

times as large as its standard error (Table III) there is little possibility that any of the gains are due to chance; and the data indicate con-

TABLE III

SIGNIFICANCE OF THE DIFFERENCES IN GAINS MADE BY MATCHED PAIRS

School	A	B	C	D
Grade	12th	9th	9th	7th
Number of Pairs	28	64	38	20
Time Limits	6 wks.	6 wks.	1 sem.	1 sem.
	Critical Ratio	Critical Ratio	Critical Ratio	Critical Ratio
I Q	2.1	1.5	− .9	.4
Mental age	2.0	1.2	− .6	.5
Reading score	6.6	6.2	5.0	4.7
Reading rate	2.8	2.5	2.1	1.5
Reasoning	3.6	5.5	2.3	2.0
Transfer†	H3.1	C3.3	C2.5* S1.6*	H4.8

*17 matched pairs
†H = History C = Civics S = Science

clusively that the variable described in this report has produced improvement with these pupils to the reliable extent represented by these critical ratios.

Intelligence quotient and mental age.—Changes in scores on the intelligence test occurred in all four grades with corresponding changes in I Q and mental age; but critical ratios no larger than 2.1 indicate that the changes are not free from the effect of chance. It is apparent, however, that in Schools A and B, the training tended noticeably to increase pupil ability to earn scores on the Terman intelligence test.

Reading ability.—The training showed greatest effects upon pupil ability to earn scores on the reading test, the trained groups making gains with critical ratios from 4.7 (7th) to 6.6 (12th). At the beginning of the experimental period each school was below grade norm in reading ability as measured by the Haggerty test, the 12th grade having low 10th grade ability, the two 9th grades having 8th grade ability, and the 7th having low 6th grade ability. No control group raised its score more than 1.1 test points, which made no change in the grade placement of the control groups in any school. In fact, the control group in one 9th grade read more poorly at the end of the experiment than at the beginning. The experimental groups, however, made gains from 9.7 to 15.7 test points (Table II) and improved their ranking from one to two whole grades according to the Haggerty grade norms.

Reading rate.—These wholly significant gains in reading ability for all four experiments were accompanied by a slowing down in the rate of reading typical textbook materials, the experimental pupils taking from 1.5 to 2.5 minutes longer (Table II) to read a stand-

ard selection at the end of the experiment than their matched controls. The significance of change in reading rate (Table III) was greatest for the 12th grade (2.8) and least for the 7th (1.3).

The changes in reading ability in general indicate a certain type of transfer. The training included reading both long and short selections and making a careful written outline or summary of the thought. The Haggerty test requires, in addition to vocabulary and sentence sense units, reading short unrelated paragraphs and answering questions directed not at revealing the complete organization of the paragraph but rather at recalling isolated facts and details. Improvement in this sort of paragraph comprehension (which was not included in the training) must then be due to the transfer of an ideal of careful reading.

Reasoning.—In each school the experimental groups made greater gross gains (Table II) on the reasoning test than were made by the corresponding control pupils. The significance of these gains (Table III) is wholly reliable (3.6 and 5.5) in Schools A and B and is very high (2.3 and 2.0) in Schools C and D. That all gains in reasoning were due to transfer is clear, since no formal reasoning problems of any sort were included in the training. The effect of the transfer was most significant in the 9th grade unit (5.5) and least in the 7th grade unit (2.0).

Transfer to content subjects.—In each school, gains made on achievement tests in transfer subjects (history, civics, science) were greater in the experimental groups than in the control groups. Greatest transfer of outlining as a study method occurred to 7th grade history, the gains having a significance of 5.0 (Table III). Least transfer occurred to 9th grade science, the gains having a significance of 1.6.

From all of these foregoing data, it appears that the training, consisting of the use of outlining as a method of studying typical miscellaneous textbooks materials and mastering their logical organizations, transferred effectively with 7th, 9th, and 12th grade pupils to produce improved performance on reading tests, reasoning tests, and achievement tests in history, civics, and general science. The critical ratios for these transfers, while not so high as some found by Woodrow in his experiment with memory, appear to have educational significance in view of the fact that the present study was subjected to the hazards of classroom procedure.

INTENSIVE VERSUS INTERMITTENT EXPERIMENTS

At the 12th grade level in School A and at the 9th grade level in School B, the work was conducted intensively; that is, the pupils studied the training sheets five days a week for six school weeks, during which six-weeks period they did none of the regular English work. At the 9th grade level in School C and at the 7th grade level in School D, the work was conducted intermittently; that is, the pupils studied the same training sheets two days a week for 15 school weeks (one semester); on the other three days of each week they followed the usual curriculum in English.

A comparison of the two intensively-trained schools (A and B) with the two intermittently-trained schools (C and D) shows the following differences. First, the critical ratios for changes in scores on the intelligence tests are much higher for the intensively trained groups than for the intermittently trained groups (see I Q and M A in Table III). Since it is not likely that native intelligence could be so greatly modified in six weeks, these changes are best interpreted as changes in pupil ability to earn scores on the tests, ability that may be closely related to reading.

Second, the significance of gains in scores on the *Haggerty Reading Examination* appears greater for the six-weeks-intensive group than for the semester-intermittent group (Table III). This result harmonizes with the changes on the intelligence test. The significance of the slowing down in reading rate was also greater for the two intensive groups than for the intermittent groups.

Third, in reasoning, both the experimental and control groups of the two semester units made greater gross gains (Table II) than did the two six-weeks units. These data correspond with those under mental age, the factor of maturation apparently entering in to insure the solving of several additional problems by those pupils measured over the longer time unit. The significance of these net gains, however, is not so great as that of the six-weeks groups, whose critical ratios of 3.6 and 5.5 (Table III) noticeably exceed 2.3 and 2.0 of the semester groups.

Finally the reliability of gains made on tests in transfer subjects is greater for the six-weeks groups than for the intermittent groups. In the former, transfer ratios of 3.3 and 3.1 indicate little probability that the gains were due to chance. In the two intermittent groups, however, the evidence is conflicting, the critical ratios being

1.6 for 9th grade science, 2.5 for 9th grade civics, and 5.0 for 7th grade history. With the exception of the transfer subject the significance of gains made on the six-weeks intensive plan is regularly greater than on the semester intermittent plan.

The two ninth-grade experiments.—Certain interesting comparisons between Schools B and C can be made, since both are 9th grade groups. Table I shows that in all measures except reasoning and civics, School B had an initial advantage. At the end of the training, School B had made more significant gains on all tests, including these two. Gross gains on test scores in intelligence, reasoning, and civics are greater for the semester unit (School C); but on each of the six factors measured, School B (six-weeks unit) has the higher critical ratios. These data show that intensive training on the six weeks basis in the 9th grade was more effective than intermittent training on the semester basis.

CONCLUSIONS

Insofar as the pupils coöperating in this experiment were typical of 7th, 9th, and 12th grade pupils in general, insofar as the variable was truly isolated or controlled, and insofar as the tests used were valid and reliable measures of the several abilities concerned, the following conclusions may be reached and inferences drawn:

1. Training in the conscious use of outlining as a method of study (as a learning skill), when taught through practice with general materials, will transfer to specific study situations and tend to improve mastery of content subjects.

2. The mental skills involved in outlining and summarizing, described herein as the processes of logical organization, transfer to produce improvement in general thinking or reasoning ability, as tested by problems not related to the specific school curriculum.

3. Training in logical organization of the sort given in this investigation produces marked improvement in reading ability, slowing down somewhat the speed of reading typical study materials and greatly increasing comprehension.

4. Such training, given as early as the 7th grade, produces satisfying improvement in reading and reasoning, and especially in the mastery of content subjects.

5. Such training produces highly significant improvement in reading, reasoning, and mastery of content subjects when given either to 9th or 12th grade pupils.

6. The effect of the training upon intelligence scores (M A and I Q) is not great, such gains as occur probably being due to improved reading ability.

7. Training in logical organization appears to be somewhat more successful if given intensively during a short period of time than if given intermittently during a longer period.

8. Skill in outlining, as a study habit, is a highly successful aid to learning.

9. Improvement in thinking, as exemplified in reading comprehension, reasoning, and understanding of comprehensive units of content subject-materials, can be achieved in the public schools under normal classroom conditions by giving pupils directed practice in outlining and summarizing.

EXTENSIONS OF THE PROBLEM

The problem undertaken in this study overlaps many interesting fields of research, and its complexity raises many questions that the limitations of time did not permit us to include in this study. A few of the problems growing out of it or having direct reference to it are proposed below:

1. To what extent will training in outlining (organization) improve a pupil's ability in composition, as defined by the usual English curriculum? The answer to this question is contingent upon the development of an objective measure of the worth of a composition.

2. To what extent will such training improve a pupil's ability to make outlines? The answer to this pertinent question depends upon the development of a fair method of grading an outline so that the score represents the pupil's ability to see relationships among ideas rather than merely his ability to use a formal system of logical symbols.

3. To what extent does training in thinking hinge upon the vocabulary or concept equipment of the student?

4. In solving thinking problems, to what extent is a pupil's success due to a rich supply of facts or to his ability to arrange those facts in proper patterns? Can these two aspects of thinking be isolated and measured?

5. When can thinking processes be said to be habitual?

6. Can educators depend upon the several types of subject-matter to develop, collectively, a pupil's ability to infer, to evaluate evidence, to verify data, to test hypotheses, to investigate the worth of an authority, to observe accurately and impartially, or to suspend judgment until all the evidence is in? Or will better results follow if these thinking habits are severally made the conscious goals of instruction, with such subject-matter materials as best suit their development grouped to that end?

FLUCTUATIONS IN GENERAL CULTURAL INFORMATION AMONG UNDERGRADUATES

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I. WHAT IS THE NATURE OF THE INTELLECTUAL PROGRESS MADE BY COLLEGE STUDENTS?

IN reporting some of the preliminary results of the "Study of the Relations of Secondary and Higher Education in Pennsylvania," the research staff of the Carnegie Foundation for the Advancement of Teaching recently threw a bombshell into many academic circles by its announcement that the general culture information of all four undergraduate classes was approximately on the same level. With the intelligence means fairly stable, the average freshman did practically as well as the average senior in the four comprehensive fields of foreign literature, fine arts, history and social studies, and general science. The same extraordinary overlapping of performance which has distressed educators in the elementary field apparently persists in even more marked form on the collegiate plane.

Obviously, this startling revelation seemed to involve an indictment of the efficacy of our present practices, and many administrators speedily began the hunt for some explanation of these curious results. Its sheer length and wide range of sampling eliminated any question as to the reliability of this particular test battery, but the more difficult issue of validity (which many test-builders have evaded) presented a more vulnerable point of attack. However, from a commonsense approach and in the light of the objectives and content of the traditional liberal arts curriculum, there seems little reason for doubting the legitimacy of the opinion that actual growth in "cultural mastery" should be indicated by the scores on the Carnegie blank;—especially since the items comprising it were all prepared by experienced college instructors, who, presumably being cultured individuals themselves and in the most strategic position for appraising it in others, would probably emphasize only that material which professional contacts had shown to be most diagnostic of its presence. This, of course, is not a quantitative demonstration of a test's validity but it does create a strong presumption in its favor. The mere fact that a test designed to uncover racial differences fails to do so does not mean that the test as such is no good; it may merely show that no significant race differences exist!

Other officials, similarly concerned over the condemnation of their activities which the test results implied, felt that the battery took no account of the majors and minors and numerous other subjects that may have been taken by the seniors since their freshman year, and of the consequent broadening of their knowledge that may have resulted. But as Learned[1] remarks, we should then expect to find evidence of the fruits of their broader training in that section of the examination that takes account of increasing knowledge in the various sub-divisions of the main branches of instruction. However, no important gain over the freshman results was discoverable at that point. If one assumes that the gains which have been made in college have been limited to more specialized or professional areas, an equally serious situation ensues for it shows that the broad basic training—the *raison d'être* for the institution itself has been neglected.

There remains the problem of forgetting. All retention studies[2] show that the lapse of one year suffices to produce a loss of from fifty to eighty percent of the material "known" at the end of a course. Mathematics is a classic example of such deterioration. It is conceivable that the stability of the average cultural scores of the undergraduates may really be symptomatic of true intellectual progress, since the gain in one set of facts has been masked by the loss in another. The net tangible advance under such conditions might well be zero — a case of running as fast as possible in order to stay where one is. The retention curves for some data balance or cancel the learning curves for different groups of ideas. Every educational psychologist knows that all learning curves are to some extent also forgetting curves, since in each succeeding practice session some time has to be devoted to restoring skill to the level of the preceding period before actual improvement is manifested. If the drill is only long enough to prevent the decline which would otherwise inevitably occur, a straight line indicative of gross *stability* (but not absence of inner *reorganization*) results. But this constancy of the medians is compatible with wide fluctuations in the actual items constituting them, just as the economist's price index may remain unaltered despite numerous changes in its composition. Information

[1]Learned, W. S. *Study of the Relations of Secondary and Higher Education in Pennsylvania*, Reprint from the Twenty-Fifth Annual Report of Carnegie Foundation for the Advancement of Teaching (1933), pp. 8-13.

[2]See the useful composite graph for several subjects on page 400 of Pressey's *Psychology and the New Education*, New York, 1933.

once possessed but not now available is not necessarily useless—it may function as a background, coloring one's attitudes and affecting (à la Herbartian apperception) the assimilation of kindred ideas. The boast of the humorist that he had forgotten more than the other fellow ever knew may well represent a profound pedagogical insight, for the "culture" he retained was not an assemblage of detailed items, but a permanently altered mental organization. It would require an excursus into Gestalt theory to elaborate this position, but enough considerations have been advanced to suggest that this hypothesis — the point of departure of the investigation here recorded — is not unreasonable.

II. A COMPARISON OF THE GENERAL CULTURE SCORES MADE DURING SUCCESSIVE COLLEGE YEARS

As part of a state-wide follow-up and survey the *Carnegie General Culture Test* was taken in 1930 by all Sophomores enrolled in the School of Education at the Pennsylvania State College, in the belief that a knowledge of the variations in cultural information among prospective teachers would be a great help to the personnel and guidance functions of the staff. The identical test was repeated in 1932 with the same subjects who now had Senior standing; the examination was also given to all persons of Freshman status in that year. Since the original announcement of the Foundation (to which reference has been made above) dealt only with a comparison of college classes comprising different *individuals*, it was felt that an analysis of the *same* persons when their class status had been changed by the two-year interval should prove illuminating. Consequently, the main emphasis of this study lies in an inspection of the Sophomore and Senior scores.

The *Carnegie General Culture Test* consists of three parts: foreign literature, 333 questions; fine arts, 251 questions; history and social studies, 346 questions; but since science is such an integral part of our contemporary civilization, it was decided to include the general science booklet (290 questions) in the battery, making a total of 1220 questions. Objective statements of the true-false, matching, and multiple choice type are used throughout. The first and last of these types are strictly amenable to correction for guessing, but in the first tabular presentation below, it seemed wise to use only the actual number right.

From Table I it will be observed that the average Sophomore excelled himself as a Senior in foreign literature, fine arts, and history and social studies — the cultural realm in the narrower sense. The

TABLE I

CENTRAL TENDENCIES, VARIABILITIES, INTERCORRELATIONS, AND RELIABILITIES OF THE DIFFERENCES OF THE SCORES MADE ON THE CARNEGIE GENERAL CULTURE TEST BY THE SAME SEVENTY-SEVEN STUDENTS AS SOPHOMORES AND AS SENIORS

Division	Class	Mean	S.D.	Median	$S.D._{aver.}$	Differences between Means	$S.D._{diff.}$	$\frac{Diff.}{S.D._{diff.}}$	Chances in 100 against Reversal	In Favor of	Sopho more-Senior Correlation
Foreign Literature	So.	74.77	30.87	81.19	3.51	.94	3.22	.29	61	So.	.65
	Sr.	73.83	35.90	73.27	4.09						
Fine Arts	So.	81.21	31.50	87.17	3.59	14.71	3.49	3.93	100	So.	.45
	Sr.	67.50	26.11	69.96	2.97						
History & Social Studies	So.	109.98	45.17	110.60	5.14	1.56	5.87	.27	61	So.	.48
	Sr.	108.42	50.96	111.66	5.80						
General Science	So.	127.75	25.01	131.33	2.85	4.11	2.48	1.48	93	Sr.	.68
	Sr.	131.86	28.56	140.05	3.24						
Entire Battery	So.	394.43	113.10	401.50	12.89	6.11	8.87	.70	76	So.	.75
	Sr.	388.32	114.87	387.53	13.09						

Seniors improve upon their Sophomore scores only in general science, with the result that the grand total mean in general culture still favors the younger group. Except for the fine arts division the Seniors are consistently more variable than the Sophomores, a fact which implies that both the best and the worst representatives are to be found among the upperclassmen. In view of the general aesthetic naïveté of young folk and the low intellectual repute of the sophomore among his faculty supervisors, it is startling, to say the least, that he should exhibit his most decisive superiority to the Senior in the fine arts. The modest correlation of .45 between sophomore and senior scores in the fine arts suggests that this information remained a thing apart and failed to be integrated with his major life purposes, while the best coefficient of .68 in general science leads to the opposite assumption; unfortunately, there is no direct way of testing the correctness of this opinion.

Table II contains the results obtained from the Freshman group which was analyzed largely for the purpose of yielding some clews to account for the odd findings mentioned above.

While one should not over-emphasize these figures because a wholly different group of personalities are involved, one may employ them in the absence of similar scores from the identical individuals as freshmen. No great violence is done if we treat them as approximate substitutes, since it is known that the general intelligence level of the entering classes has not altered in the last few years. The freshman

TABLE II

CENTRAL TENDENCIES AND DISPERSION OF SEVENTY-SEVEN FRESHMEN IN THE VARIOUS DIVISIONS OF THE GENERAL CULTURE BATTERY

Section	Mean	Median	S. D.
Foreign Literature	48.00	53.00	32.42
Fine Arts	65.23	66.91	31.78
History and Social Studies	93.82	89.99	45.12
General Science	130.14	130.70	26.98
Entire Battery	351.79	342.48	111.33

total and sectional means are well below the sophomore averages, save in the field of general science, where they are practically equal to the seniors. In the fine arts, too, the freshmen do only slightly less well than the seniors. So far as the surface record of these comprehensive scores is concerned, it would appear that the major gains in general culture take place during the first two college years, rising to a peak at the end of the sophomore year and then declining slightly before graduation.

III. RESULTS OF THE ITEM ANALYSIS

The raw findings just presented do not give much of a hint in accounting for the amazing equivalence of the sophomore and senior scores. Consequently, a detailed and laborious item analysis of each of the 1220 questions in the battery was undertaken in the hope of discovering the broader categories into which the inferiorities and superiorities of the respective groups could be classified. The total number of subjects who answered *each item* correctly, the total number who marked it incorrectly, and the total who omitted it were compiled for both classes. All the individuals who took the tests were used this time and not just the seventy-seven identical subjects. For convenience of presentation, the means only are given in Table III.

In the main, these figures confirm the preceding account, but an important element appears in the implications of the average number incorrect and the average number omitted. While the sophomores had a larger number correct, they also had far more incorrect. Taken in conjunction with the fact that they omitted the least number of items, it would seem that the sophomores were guilty of much more guessing than the seniors who evidently were less willing to "take a chance." Obviously, then, the sophomores were able to secure a larger total of rights because they were willing to risk making more wrongs. This temperamental bravado is later overcome, but its marked presence in the

TABLE III

TOTAL ITEM ANALYSIS WITH THE MEANS OF CORRECT, INCORRECT AND OMITTED RESPONSES (N = 130)

Section	Sophomores	Seniors
Mean Number Correct		
Foreign Literature	83.10	78.10
Fine Arts	83.11	77.42
History and Social Studies	123.50	118.93
Science	132.59	143.62
Entire Battery	422.30	419.02
Mean Number Incorrect		
Foreign Literature	164.47	109.14
Fine Arts	106.14	68.98
History and Social Studies	137.21	98.23
Science	98.79	90.09
Entire Battery	506.62	366.52
Mean Number Omitted		
Foreign Literature	85.42	144.73
Fine Arts	61.74	104.60
History and Social Studies	85.29	128.83
Science	62.23	58.27
Entire Battery	294.68	436.45

sophomores complicates what was intended to be a purely cognitive set of responses with an effective element of uncertain dimensions.

IV. DETERMINATION OF VALIDATED ITEMS

Any measure of a "trait" is normally considered valid if it corresponds closely with an independent and acceptable measure of that function. In the case of most mental tests, the establishment of validity has required matching the ratings of competent and experienced judges with the results of the original test form, so that eventually the test becomes an expedient substitute for a large number of random contacts. This is the most satisfactory empirical procedure, although a fair collection of more objective statistical devices exists for testing the internal structure of the test itself, such as the biserial method for measuring the degree of agreement between the size of the total scores on the blank and the proportion of "rights" for individual items. So far as we are aware, none of these checks has been employed by the Carnegie staff, so that the validity of the *Carnegie General Culture Test* remains unknown.

In a certain sense, the constancy of the culture averages demonstrates the invalidity of the battery, since it fails to differentiate groups which we know are different. If the *Stanford Achievement Test* failed to exhibit successive increments with added years of schooling, we would definitely reject it as not measuring that which it is supposed to measure.

The Carnegie blank lacks norms of all sorts — age, and "grade" norms particularly —although the survey has revealed some significant institutional and professional averages. Of course, one could argue that the growth curve for cultural attainment, like that for intelligence, eventually ceases, or that what a man learns in this respect is independent of the number of years of formal schooling. Such, indeed, are about the only interpretations one can give for these strange findings — yet they are clearly repugnant to common sense.

If one is searching for genuinely valid measures of sophomore or senior status, one can derive from the battery specific items in which one class displayed a marked superiority or inferiority to the other. Suppose, e. g., that 50 out of 77 seniors answered question number 1 correctly, whereas only 30 out of the 77 sophomores marked it properly. This item could then be said to have a diagnostic value for purposes of differentiation. If in question number 1000, the tables were turned with 25 sophomores responding adequately against but 5 seniors, a symptomatic item with the reverse sign would be determined.

Employing such a calculation, we found 47 questions which satisfied this criterion; i. e., items which yielded a superiority of 20 or more for one group; 33 favored the seniors and only 14 the sophomores. It was hoped that these extreme cases would serve to reveal the specific fields in which either group showed relative excellence. Unfortunately, nothing like that resulted. What shall we make out of a situation which tells us that the seniors are more familiar with the fact that "Greek is a more inflected language than English," while the sophomores are better informed on the role Alcibiades plays in the "Symposium"? The seniors are aware that Michelangelo is identified with the ceiling of the Sistine Chapel, but the underclassmen know more about El Greco's ghastly greenish-grey light. The seniors are better acquainted with the Egyptians, but the sophomores have more accurate information about Neolithic man. And so on. The relative excellences apparently are highly specific and not at all general. Sixteen superiorities, or about one-half of the seniors' total dominance, occur in the field of general science; no item in the division was answered correctly by a plurality of twenty sophomores. Perhaps this is the area in which the college does its most effective work, although the fact that the freshmen mean in science is better than the sophomore average and almost as high as the senior makes this a dubious suspicion.

Measured by this method of extreme disparity in individual items, (which is the most direct way of detecting truly valid questions) the sophomores excel the freshmen even more completely than the former are outshone by the seniors. Twenty-nine statements in the battery yield a superiority of twenty or more in favor of the sophomores as compared with but two in which the freshmen are similarly ahead. A condition with such pronounced advantage at the extreme is suggestive of heteromodality in the populations, but an inspection of the distribution curves unearthed no evidence of bimodality in any division of the battery.

V. CONCLUSIONS

There seems to be no escape from the conclusion that, as measured by this battery, the *average* general cultural information possessed by the college senior is no greater than what he knew as a sophomore — in many respects it may, in fact, be even poorer. This is an admission which is not easy to make, particularly in view of the discredible failure of the college to alter notably the fundamental life attitudes and beliefs of its charges.[3] Evidently the absence of significant personal modifications is discernible in both the intellectual and affective phases of mental life.

However, it is not true that no changes whatsoever have occurred, for as was pointed out above and verified by the item analysis, a stability of the means from year to year may result even though all the items contributing thereto are different. Conceivably, if a given youngster has a total battery score of 350 as a sophomore, he may end as a senior with the same value, although on the first occasion he may have had only even numbered questions correct and on the second only the odd ones. This indicates the constant operation and interplay of new acquisitions and older losses in the mean scores. But why haven't the averages risen? In part, perhaps, because the sophomores may have profited from a stronger guessing propensity; but largely because most of the items do not meet the simple test of validity imposed upon them. It is highly improbable that in a truly valid test of culture comprising 1220 questions, only 47 items (or about one in twenty-five) should clearly set off one group from another. Only a small proportion of

[3] Dudycha, George J. "The Social Beliefs of College Seniors," *American Journal of Sociology* (1932), pp. 775-779. He reports that the social convictions of his seniors closely resemble his freshmen group.

the items are really sensitive enough to betray the actual changes in intellectual content which have taken place during the two-year span.

It is possible, of course, that the customary means of establishing validity are not applicable here. If we assume that a technically adequate validity coefficient is implicitly present, albeit hidden for the moment, the apparent lack of cultural progress may be accounted for by the failure of much of the information to contribute to the attainment of the major life purposes of the learner. The scholarly data which encumber the pages of the test booklet, redolent of a conservative academic tradition, are simply irrelevant to the principal concerns of contemporary undergraduates. They fail to grip the psyche at any vital point and hence readily disappear when the organism is called upon to adjust itself to more "serious" activities. As Anatole France says through the lips of his scholarly hero, Sylvestre Bonnard, "In order that knowledge be properly digested, it must have been swallowed with a good appetite." It is between this devil of invalidity and the deep sea of curricular maladaptation that one must choose if one wishes to explain the amazing riddle with which we began.

VI. SUMMARY

1. The mean scores made on various divisions of the *Carnegie General Culture Test* are approximately alike for the same college students when measured as sophomores and again as seniors.

2. This stability of the averages is accompanied by a great fluctuation among the component items which are registered as "known," indicating that gains in some areas are masked by losses in others.

3. The superiority of the senior to the sophomore or *vice versa* does not lie in any given branch or knowledge (with the possible exception of general science), but tends to be highly specific.

4. The sophomores are more prone to guess as shown by the omission of one-third fewer items and a fifty percent excess in number incorrect; this tendency is probably partly responsible for their relatively high total scores.

5. Only 47 out of 1220 questions are answered correctly by an excess of about one-quarter of one class over the other, suggesting that the conventional requirements of validity may not have been fully met by this examination. The mere fact that a small number of questions can be constructed which will effectively discriminate the seniors from the

sophomores seems to indicate that the entire test should have been built of such items.

6. The best psychological explanation for the ephemeral character of the cultural information of this student population appears to be that the facts here involved fail to be organized into the significant life objectives of the individuals.

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THE RELIABILITY AND VALIDITY OF THE STANFORD-BINET TESTS WHEN ADMINISTERED BY STUDENT EXAMINERS

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A number of studies have been made relative to the reliability and validity of the Stanford-Binet tests when administered by student examiners. The problem is obviously a practical one since it has an important bearing on the question of whether teachers should be trusted to use this test on their pupils. Perhaps the first study of this type was one on the training of a group of inexperienced teachers by Samuel C. Kohs quoted by Dr. Terman[1]. The results of this study indicate that a summer school course of six weeks was sufficient to equip teachers with a reasonable degree of accuracy in the use of these tests. A more recent study was made by Virgil E. Dickson[2] with a group of first-grade and kindergarten teachers who were given instruction weekly for fifteen weeks and gave from "sixteen to twenty" examinations under careful supervision. Dickson found that this amount of training with some follow-up work resulted in a reasonable degree of accuracy in the use of the tests.

The present study differs from the foregoing ones in that it deals with the training of students in a two-year normal school course. The practical nature of the problem is evident from the fact that the majority of elementary-grade teachers are still certified to teach after a training period of two years beyond high school graduation. The problem then is: Can students during this period learn to use the Stanford-Binet test with a satisfactory degree of reliability and validity? The data compiled in the following tables in answering this question were obtained by the writer in connection with the teaching of courses in mental testing during the first quarter of the school-year 1929-1930, the third quarter of 1930-1931, and the third quarter of 1932-1933. The classes met three times each week for a period of twelve weeks during their second year at the normal school. Prerequisites for enrolling in the course were two quarters work in educational psychology

[1]Terman, L. M. *The Measurement of Intelligence* (Boston: Houghton Mifflin Company, 1916), pp. 108-109.

[2]Dickson, Virgil E. *Mental Tests and the Classroom Teacher* (Yonkers: World Book Company, 1923), pp. 198-202.

and one quarter in educational tests. The basal textbook was Terman's *The Measurement of Intelligence* and the requisite materials for giving the Stanford-Binet tests. Liberal use was also made of other standard works on the measurement of intelligence. After three or four weeks of preliminary instruction and observation, the members of the class began actual testing of elementary-grade pupils in the campus-training school. Errors in administering and scoring tests were discussed at the next meeting of the class. A total of 85 pupils were examined in 1929, 95 in 1931, and 170 in 1933. The number of pupils tested per student examiner is indicated in Table I.

TABLE I

NUMBER OF ELEMENTARY-GRADE PUPILS TESTED PER STUDENT EXAMINER DURING 1929, 1931, AND 1933

Number of Pupils Tested	Frequency of Examiners		
	1929	1931	1933
39	.....	.....	1
24	.....	.....	1
23	.....	.....	1
20	.....	.....	2
13	.....	2	2
11	1	1	0
10	3	3	2
9	1	0	1
7	3	1	0
6	6	1	0
5	0	0	1
4	0	0	1
3	1	1	.....
2	2	5	.....
1	1	2	.....
Total Number of Pupils	85	95	170
Total Number of Examiners	15	16	11
Average Number of Pupils per Examiner	5.66	5.93	15.45

It will be seen from Table I that each student examiner tested relatively few pupils, only four of them testing as many as twenty or more. It will be seen also that the 1933 group of examiners tested more pupils as a group as well as per examiner. It should perhaps also be made clear that each student examiner tested during one year only. In other words, no pupil was tested more than once by the same examiner. Table II shows the correlations between IQ's of three groups of pupils each of which was tested in two different years. It shows also the number of pupils tested in each group on which the

correlations, means and standard deviations are based. The means and standard deviations in this table are the averages of the two means and standard deviations obtained for the two years each group was tested—a procedure which is justified, since the number of cases is constant.

TABLE II

CORRELATIONS BETWEEN I Q'S OF THREE GROUPS OF PUPILS EACH OF WHICH WAS TESTED DURING THE INDICATED YEARS, THE MEAN IQ'S, THE STANDARD DEVIATIONS, AND THE NUMBER OF CASES FOR EACH GROUP

Number Tested	When Tested	Coefficient of Correlation	Mean	S. D.
22	1929 and 1931	.69 ± .078	103.07	12.28
19	1929 and 1933	.65 ± .087	104.20	11.57
33	1931 and 1933	.80 ± .042	106.50	13.12

Table III shows inter-correlations of IQ's for eleven pupils who were tested each of the three years 1929, 1931, and 1933. It shows also opposite each year the mean IQ and the standard deviation for the eleven pupils tested that year.

TABLE III

INTER-CORRELATIONS BETWEEN IQ'S OF ELEVEN PUPILS TESTED IN 1929, 1931 AND 1933, THE MEAN IQ'S, STANDARD DEVIATIONS, AND NUMBER OF CASES FOR EACH YEAR

	Number Tested	1931	1933	Mean	S. D.
1929	11	.80 ± .074	.86 ± .053	101.60	9.00
1931	11		.94 ± .036	100.23	12.50
1933	11			98.80	12.80

It will be seen from Tables II and III that the reliability coefficients for the Stanford-Binet IQ's range from .65 to .94. This compares very well with reliabilities of the Stanford-Binet IQ's and MA's when given by trained examiners according to Kelley[3]. The reliability coefficients quoted by Kelley range from .90 to .95 for various age and grade groups. The student examiners compare even more favorably with the trained examiners when consideration is given to the fact that the reliability coefficients obtained from student testing are based on single grade groups with relatively narrow ranges in terms of IQ as indicated by the standard deviations (see Tables II and III).

[3]Kelley, T. L. *Interpretations of Educational Measurements* (Yonkers: World Book Company, 1927), pp. 294-295.

It will be recalled from Table I that the 1933 group of student examiners tested a relatively large number of pupils (170). A total of 136 of these pupils were in Grades I to VII inclusive and were distributed by grades as indicated in Table IV. Reliability coefficients of Stanford-Binet mental ages obtained by this group were calculated by scoring each pupil separately on odd and even test items and correcting by the Spearman-Brown formula. Table IV shows the number of pupils tested in each grade, the correlations, means and standard deviations based on the number of cases indicated for each grade.

TABLE IV

RELIABILITY OF STANFORD-BINET MENTAL AGES FOR 136 PUPILS TESTED IN 1933 IN GRADES I TO VII BY ODD VERSUS EVEN METHOD AND CORRECTED BY SPEARMAN-BROWN FORMULA (MEAN MA'S AND SD'S ARE AVERAGES OF ODDS AND EVENS OF THE GROUPS OPPOSITE WHICH THEY APPEAR)

Grade	Number Tested	Coefficient of Correlation	Mean M. A. in Months	S. D
I	25	.90 ± .025	90.60	16.02
II	21	.82 ± .047	106.80	12.15
III	16	.83 ± .053	119.05	12.70
IV	15	.78 ± .067	129.89	13.88
V	21	−.009 ± .230	140.47	12.65
VI	23	.57 ± .094	158.30	9.77
VII	15	.64 ± .101	172.15	12.90

It will be seen from Table IV that with the exception of Grade V, the reliability coefficients obtained are relatively high. This is especially significant on account of the narrow age range as indicated by the standard deviations. Grade I which yields the highest reliability coefficient (.90) also has the widest range in mental age. The zero reliability obtained for Grade V (−.009) is probably best accounted for by the fact that the odd vs. even method of scoring becomes coarser in the higher levels reached by pupils in this grade. For example, in Year XII on the scale each test item counts three months, in Year XIV, four months, and in Year XVI, five months. Examination of the record cards revealed that only five of the pupils passed test items as high as Year XVI, four of these passing one item each and one pupil passing two items. Similarly twelve pupils reached their highest levels in Year XIV, eleven of them passing one item and one passing two items in this year. It can readily be seen that the relatively great weight given to the items in Years XIV and XVI and the small sampling of items passed in these years might easily result in some pupils earning

higher mental ages on the odd-numbered items while others earned higher mental ages on the even-numbered items. At any rate, this is actually what happened in the present case. This explanation of the zero reliability in Grade V shown in Table IV gains support from the fact that the correlation between the IQ's and EQ's of the 21 pupils in the grade is .85 (See Table V). In other words the low reliability due to the chance factors pointed out appears to be spurious. The same explanation plus the narrow mental age range, especially in Grade VI, may account for the relatively lower reliability coefficients in Grades VI and VII.

The foregoing tables and accompanying discussions have been concerned primarily with the reliability of the Stanford-Binet tests when administered by student examiners. In Table V which follows is presented evidence relative to the validity of these tests when so administered. The 1933 group of pupils who were given the Stanford-Binet tests had just taken also the New Stanford Achievement Test. It thus became a simple matter to compute correlation coefficients between these two tests for each grade. On the assumption that learning involves intelligence the correlations obtained may be regarded as criteria of the validity of the Stanford-Binet tests in the hands of student examiners. These correlations are presented in Table V.

TABLE V

CORRELATIONS BETWEEN STANFORD-BINET IQ'S AND STANFORD ACHIEVEMENT TEST EQ'S FOR GRADES II TO VII INCLUSIVE, AND OTHER SIGNIFICANT DATA*

Grade	Number of Cases	Coefficient of Correlation	Mean IQ	Mean EQ	S.D. (IQ)	S.D. (EQ)
II	21	.69 ± .074	109.15	106.05	15.40	15.80
III	17	.76 ± .067	109.95	106.30	15.05	13.65
IV	14	.81 ± .061	103.20	106.15	13.60	13.00
V	21	.85 ± .040	106.05	108.45	12.15	11.75
VI	23	.74 ± .060	109.90	111.65	14.60	13.10
VII	21	.69 ± .074	112.50	113.50	16.75	11.45

*The pupils in Grades II, V, and VI in this table are identical with the pupils in these grades in Table IV. Grade III has one other pupil; Grade IV has one less pupil; and Grade VII has 8 other pupils than the corresponding grades in Table IV.

The correlations indicated in Table V compare very favorably with similar correlations compiled by others. Thus Pintner[4] quotes ten correlations of other intelligence tests with the Stanford-Binet which range from .49 to .98 as compared with a range of coefficients of corre-

[4]Pinter, Rudolph. *Intelligence Testing* (New York: Henry Holt and Company, 1931), p. 112.

lations in Table V from .69 to .85. Moreover several of the high correlations quoted by Pintner are obtained from groups representing wide age or grade ranges as compared with the narrow ranges indicated in Table V. Thus the coefficient of .98 quoted by Pintner was obtained from a group with a "wide age range." If this high coefficient is excluded, the other coefficients range from .49 to .88. At any rate the facts presented in Table V justify considerable optimism concerning the validity of Stanford-Binet test scores obtained by student examiners with a moderate amount of training.

The foregoing tables lead to the conclusion, then, that student examiners under the conditions of the present study are well on the road to become competent examiners. It is conceivable, of course, that an examiner who can obtain reliable and valid results in the use of an intelligence test, may still be so deficient in judgment and discrimination that he misuses the results obtained. This danger, inheres in all practice of techniques used in education, however, as well as in other professions. The writer has not yet discovered, however, after teaching more than a dozen classes in the manner outlined, any student who has failed to exercise common sense in the use of intelligence tests in the field.

A final outcome of the present study in which the 1933 group of student examiners participated was most satisfactory from the instructional standpoint. As the study progressed and the members of the class came to understand the significance of the reliability coefficients, their avidity and enthusiasm for further study increased enormously. The effect on the class of definite knowledge of progress in understanding and using mental tests was most gratifying.

THE EFFICIENCY OF PRIMERS IN TEACHING WORD RECOGNITION

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ONE of the necessary functions of the primer is to teach word recognition. It must promote an interest in reading, a thought-getting attitude, correct eye-movement habits, and other desirable outcomes, but teaching word recognition is an indispensable function. How well does any particular primer succeed in this work? Standard tests do not tell us very well because only a part of the vocabulary of any standard test will have been taught in any particular primer. Standard tests are also seldom available because of cost. But it is highly desirable for supervisors to know what success is being secured with certain primers as compared with other primers. Very often new books are tried out, and there should be more than a mere impression as to how well they are succeeding in this fundamental phase of the teaching of reading. Teachers also benefit from having definite knowledge of the degree of success they are securing.

It must be recognized, of course, that the primer is not alone in the teaching of word recognition. In addition there are experience charts, pre-primer charts, blackboard work, cards of all sorts, and seat work, including, perhaps, work books. There are further experiences with words in supplementary books, picture books, newspapers and magazines, and on signs, and posters everywhere. Nevertheless the steady hammering of the teaching period is principally upon the primer and most of these supplementary materials are, or should be, closely correlated with the primer vocabulary. Their success is largely measured by the success achieved on the primer.

The success of any primer or first reader in teaching word recognition, due allowance being made for the factors just mentioned, can be discovered very easily by a technique that is quite in accord with that used by standard tests. Practically all primary reading books have a vocabulary list in the back. That is the material of the test. How this material can be used is shown in a recent experiment.

Two different series of readers were being used in two groups of schools. It was desired to know the relative success of the primers of these two series, that is, how well did each primer teach the vocabulary that it purported to teach? As noted above, this is not the only function of a primer, but it is a most necessary one.

The vocabulary of each primer was made into a test for that primer since each book was to be judged by the work that it set out to do. The word list in the back of the book was mimeographed in primer type, on thirty-one lines, on a single legal-size sheet. Each line was numbered at the left, and each line contained five words, separated by uniform spacing. The five words were not put in vertical columns because it was intended that they be easy to read from left to right. From this sheet were omitted proper names, compound words, and words of less than four letters. Words in these groups are so easy to recognize as to be unsatisfactory for testing purposes.

At the top of the sheet was placed a practice exercise of three lines, beginning with a, b, and c, and composed of easy three-letter words. This exercise was done first to make sure the children knew what was expected of them.

Each child was given a manila liner, since it was imperative that no one lose the place. An assistant went about the room during the testing to make sure that everyone understood directions and that no one lost the place. It was also necessary to watch some of the children to see that they did not copy from others. Those who insisted on looking on others' papers were removed from their seats to tables or to the teacher's desk.

The test was given near the end of the year, though the primer had been completed some time before. This introduced an element of uncertainty as to whether the words had been repeated in other books or otherwise reviewed. It would have been more desirable to give the test immediately after the primer was completed.

The tests were given in all the schools by an experienced tester, assisted by another person and by the teacher of the room. The tester first talked to the children about games they liked. The children all agreed that games were not fun unless everybody followed the rules. The tester then said they were to play a game, and they must be sure to follow the rules. The rules were to do just as she said and then to look right up at her so that she could tell when to go on.

The papers were distributed, face down, and all the children given pencils. Names were written on the back of the paper. Then all turned over, and the practice exercise was begun. The children placed the marker under a line, and the tester told them to draw a line or circle around a certain word in that line. The tester and assistants made sure that all children did what was expected. By the time the three

practice lines were completed, the children were moving their liners when told to do so and drawing the circles correctly.

The test consisted of one word chosen from each line. In this case, care was taken to choose words that had an initial letter different from the initials of all the other words on the same line. The test could have been made harder if the words chosen had had the same initial letters as others on the same line. Such is the plan followed in the second part of the *Pressey Vocabulary test*, after which this test is modeled.

An important feature of this method of testing is that the same stencil can be used for at least two years. New copies made from it can be used again and again by merely calling for the circling of different words. There is no unwelcome element of cramming for the test, because the words are all those of the primer and just the ones that should be stressed.

When two primers are being compared by the type of testing just described, it must be remembered that the tests do not necessarily contain the same words nor words of the same difficulty. Each primer is being judged by a sampling of its own vocabulary. If one primer has a harder vocabulary than another, it is the fault of the primer if the test results in low scores. A primer should ensure a large word recognition vocabulary. It may do this both by wise selection of vocabulary and by skillful presentation. To test the efficiency of the primer by a sampling of the words it purports to teach, is thus eminently fair.

In Table I are shown the averages secured from the use of the test as described in the two sets of schools using the two different primers. That is, each set was given the test of 31 lines of words, five words to a line, made from the vocabulary list in the back of the primer used by that particular set of schools. Since one word in each line was called

TABLE I

SCORES ON WORD RECOGNITION TEST ON BASIC PRIMERS USED IN FIRST GRADE ROOMS OF TWO GROUPS OF SCHOOLS

(31 word sampling of vocabulary of each primer)

Test on Primer A		Test on Primer B	
Schools	Average No. of words known	Schools	Average No. of words known
A	28	1	28
B	27	1	27
C	26	3	25
D	23	4	24
E	22	5	21
F	21	6	18

for, each set of children were asked to circle 31 words. The table shows in the A schools a range of averages from 28 words right in the best school to 21 right in the poorest. In the B schools the range is almost the same, except for the lower score of the poorest school.

From consideration of the table, a number of questions at once appear. First, are these averages as high as they should be? In the case of the lower schools, perhaps not. But are the higher schools satisfactory? Only repeated testing, year after year, will answer this question, and establish some sort of norm. We do not now know how efficient any primer should be, in the sense of teaching word recognition of the vocabulary it contains. The school system in question, however, will continue using this type of test year after year in order just to establish such norms.

An important aspect of the testing does not appear in Table I. The tests showed that in most of the rooms of both sets of schools there were children who had practically no word recognition of the list of 31 words. These children had sat through a year of teaching and did not recognize even the word "mother." They had stumbled along, using memory of the selection as read by others or promptings from teacher or other pupils. This outcome could have been expected because these schools, like practically all others, admit to Grade I children who are simply too immature mentally to learn to read. This fact so clearly demonstrated by this test was brought more strongly than ever to the attention of all concerned. This result alone would justify the giving of the test.

It may be asked how well a sampling of 31 words represents a total list of 155 words as taught in these primers. To answer this question, one of the test sheets was given three times in one of the rooms, each time using fresh papers and a different sampling of 31 words. The results of all three tests were combined to give a score on 93 words. The results on the single tests of 31 words each were correlated with the scores on all 93 words. Coefficients of .96, .98, and .96 were obtained. Similar results appeared on repeated tests of other rooms. Therefore a single sampling of 31 words seems to give highly reliable results.

This simple but most effective kind of test can be prepared and given in any school system. It has the hearty approval of the teachers because they realize that the test is upon what they have actually taught, and they want to know what results they have secured. It forms a basis for planning the work in Grade I, since those children who do

not know the primer vocabulary when they are through the primer should not be pushed on to more difficult work. They should have further exercises on the material of the primer or a second primer using the same vocabulary. They should not go back over the same primer because they will have memorized it page by page. Then at the end of the year, this same kind of test based on both primer and first reader can be most valuable as one criteria for promotion. No children should be promoted who do not have a satisfactory recognition of the vocabulary they have been taught. If, however, "social promotion" is practiced, the work in Grade II for such children should remain on the first-grade level and should not be an advance into greater and greater depths of discouragement.

A QUANTITATIVE ANALYSIS OF THE DIFFICULTY OF READING MATERIALS

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PURPOSE

THE purpose of this investigation is to determine the characteristics of reading materials representing different levels of difficulty. The concept of difficulty as it applies to most of the standardized materials in educational psychology is primarily a statistical concept. The difficulty of an item is generally determined in terms of the number of persons in some group which is able successfully to respond to the item in question. Little is known about the characteristics of the material which is thus statistically located at a given level of difficulty. This is particularly true of reading materials. Owing to the awareness of such a deficiency in the field of reading, the following data were secured and analyzed.

PROCEDURE

The materials of the investigation consisted of six passages of reading materials. A single passage was selected from each of the following six books: Dos Passos, *The Three Soldiers* (fiction); Bryce, *The American Commonwealth* (political science); Ely, *Introduction to Economics*, revised edition (economics); Crothers and Hudnut, *Problems of Citizenship* (sociology); James, *Principles of Psychology, Vol. II* (psychology); and Spinney, *A Textbook of College Physics* (physics). The passages were from 580 to 919 words in length. They were cast into the form of reading tests by constructing a series of true-false statements covering the content of each passage. The passage itself was left in its original, continuous, and uninterrupted form to approximate ordinary reading as nearly as possible.

The tests were administered to small groups of college students, most of whom were sophomores and juniors at the University of Michigan. The directions of administration required a single reading of each passage at a normal rate followed by an attempt to answer the true-false comprehension exercises from memory; that is, without reference to the original passage. The rate and comprehension scores consisted, respectively, of the number of words read per second and the number of true-false items marked correctly. For the purposes of the present analysis, only the rate scores are utilized in determining the level of

difficulty represented by each passage. The rate score is more convenient statistically than the comprehension score. Also, it is a more inclusive criterion of performance, since it represents both the speed of reading and the speed developed in response to a demand for comprehension of a general type.

The investigation involved more than one hundred college students, but the scores of only thirty subjects were available for the entire series of six passages. The following data consist of the results of these thirty individuals.

RESULTS

The first step in the present analysis is the determination of the relative difficulty of the various passages. This determination can be accomplished by noting the distribution of the ranks of relative difficulty of the different passages in the reading of the thirty subjects. This distribution is presented in Table I

TABLE I

A DISTRIBUTION OF THE RANKS OF PASSAGES FROM SIX TYPES OF CONTENT BASED ON THE PERFORMANCE OF THIRTY SUBJECTS

Rank	Kind of Passages					
	Fiction	Political Science	Economics	Sociology	Psychology	Physics
1	27	1	0	2	0	0
2	2	13	7	8	0	0
3	0	6	13	8	1	2
4	1	7	8	9	3	2
5	0	2	2	2	20	4
6	0	1	0	1	6	22
Ave.	1.16	2.96	3.16	3.13	5	5.53

Table I is read as follows: For twenty-seven (27) of the thirty subjects the fiction passage was the easiest or least difficult (rank I). for two (2) subjects the same passage was the next easiest (rank 2) etc. The average rank for each passage was 1.16 for fiction, 2.96 for political science, 3.16 for economics, 3.13 for sociology, 5 for psychology, and 5.53 for physics.

This table indicates that there are three distinct levels of difficulty represented by the six passages used in this experiment. The fiction passage appears at one level; the sociology, political science, and economics passages with some variation occupy another level, and the psychology and physics passages hold a higher and lower position, respectively, at another level.

The question that naturally arises is, *why are some selections so much easier than other selections?*

It was decided to make four types of analysis: To determine the number of ideas, the length of words, the length of sentences, and the types of nouns contained in each of the six selections.

1. *Does the Number of Ideas per Hundred Words Correspond to Different Levels of Difficulty in Reading Materials?* In attempting to discover the elements that cause different levels of difficulty, the investigator thought that the frequency of ideas, or what might be termed the compactness of thought, might be a significant feature. The method of scoring reproduction exercises in silent reading and memory tests was adopted for this purpose. This method has been employed in securing a measure of comprehension in some of the earlier reading tests. It was objected to on two grounds: first, it is very difficult to compare the ideas of the original passage with the ideas in a reproduction, and, second, it is very laborious to administer. But these objections do not hold for the use made of the method in this analysis. The plan was to make use of it in dividing the various passages into ideas. Precedent for this procedure was found in Gray's method[1] of scoring reproductions in his silent reading test. He states that the "significant feature of the method is that the unit . . . is a group of ideas in significant relationship." Gray then gives an analysis of one section of his reading test, a sample of which is herewith presented:

> "Tiny Tad was a queer little fellow/with only two legs/and a short tail."

The ideas are separated by the oblique mark (/). An application of this method to one of the selections used in this study can be illustrated by making an analysis of the beginning sentence in the passage dealing with political science:

> Europeans often ask/how it happens that the Presidency of the United States/is not more frequently filled/by great and striking men.

Of course, it is recognized that there is likely to be a considerable amount of subjectivity in this type of analysis, but, in order to reduce this element as much as possible, the writer used the method with various kinds of reading material outside of this experiment and later analyzed each of the six passages at two different times. The results of one analysis were employed to check the results of the other. After this was done, the number of ideas for each selection was counted and converted to a comparable basis by determining the number of ideas per

[1] Gray, W. S. *Studies of Elementary-School Reading through Standardized Tests.* Supplementary Educational Monographs, Vol. I, No. 1 (Chicago: Department of Education, University of Chicago, 1917), p. 108.

hundred words for each selection. The results for the first and the second (check) countings are presented in Table II.

TABLE II

THE NUMBER OF IDEAS PER HUNDRED WORDS IN EACH OF THE SIX EXPERIMENTAL SELECTIONS

	Type of Passage					
	Fiction	Political Science	Economics	Sociology	Psychology	Physics
First count	19	21	22	22	20	20
Second count	20	19	21	20	19	20

The results seem to indicate that there is very little difference in the number of ideas per hundred words for the various passages. An important point, however, should be made. This table shows that there is no appreciable variation in the *number* of ideas present in the different passages; it gives no clue as to the quality or character of the ideas.

2. *Does the Length of Words Have Any Bearing on Levels of Difficulty in Reading Materials?* In order to answer this question, the number of letters in each word of the six different passages was ascertained, the frequency of each word length was found, and the results were made comparable by computing the number of words of the various lengths per hundred words. The results of this study are presented in Table III.

TABLE III

THE FREQUENCY OF DIFFERENT WORD LENGTHS PER HUNDRED WORDS IN THE CASE OF SIX SELECTIONS OF DIFFERENT SUBJECT MATTER

Letters Per Word	Fiction	Political Science	Economics	Sociology	Psychology	Physics
3	8.9	4.7	3.8	2.4	1.5	2.6
4	16.1	8.5	8.6	11.4	10.5	7.7
5	8.0	8.5	10.7	9.6	10.0	8.2
6	8.6	5.6	7.7	10.3	8.0	7.7
7	6.4	9.5	6.8	8.2	8.7	7.7
8	4.6	4.2	6.5	6.5	4.3	7.7
9	1.2	5.6	5.8	3.7	3.6	7.0
10	1.2	4.2	3.0	2.7	3.2	1.6
11		.8	1.4	2.4	2.0	2.0
12		.3	.5	.8	1.2	.2
13		.3	.1		.9	1.3
14		.2				.6
Average	5.2	6.4	6.5	6.3	6.5	6.8

It should be mentioned that, since articles, prepositions, conjunctions, and forms of the verbs *to be* and *have* were not regarded as significant for the present analysis, they were not included in the word count. The

table shows, then, that, with these exceptions, there are 2.6 words, 3 letters in length, per hundred words of the physics selection, 7.7 words, 4 letters in length, per hundred words of the same selection, etc. It appears from the data that words of greater length occur with somewhat greater frequency in some passages than in other passages. Another tendency is noticeable, and that is the presence of a large number of four-letter words and the small number of nine-and-ten-letter words in the case of the passage from fiction.

3. *Does the Length of Sentences Have Any Bearing on the Levels of Difficulty of Reading Materials?* The technique employed to answer the foregoing question was very simple. The number of sentences in each passage was counted. The unit of comparison was the obvious one of the number of words per sentence. This was computed by dividing the total number of words by the number of sentences in the selection. The data secured by this procedure are arrayed in Table IV.

TABLE IV

THE NUMBER OF WORDS, THE NUMBER OF SENTENCES AND THE NUMBER OF WORDS PER SENTENCE FOR EACH PASSAGE FROM SIX TYPES OF SUBJECT MATTER

	Fiction	Political Science	Economics	Sociology	Psychology	Physics
No. Words	648	919	704	611	580	774
No. Sentences	63	36	30	30	19	43
Words per Sentence	10	25	23	20	30	18

In four types of material, the average length of sentence is about the same. But in the passages from fiction and psychology there is a wide difference. The narrative material is composed apparently of short simple sentences, while the passage in psychology is made up of long complex sentences. This fact is quite striking and corresponds to the levels of difficulty reported in a preceding section.

4. *Do the Kind of Words Have Any Bearing on the Levels of Difficulty of Reading Materials?* An analysis of this type is very difficult to make and involves elements of subjectivity. But an attempt was made to determine the kind of words used by confining the analysis to very definite types. For example, special notice was taken of technical terms and nouns used as names of common objects. This procedure led to the following quantitative data: It was discovered that the physics selection contained a large number of technical terms; to be specific, the computations revealed that there were 8.5 technical terms per one

hundred words in the physical material. A similar word count revealed only 2.2 and 1.1 technical terms per hundred words in the case of the passages from psychology and economics, respectively, while there were none in the fiction, sociology, and political science passages. Furthermore, analysis of the nouns in the narrative selection disclosed that 16.6 words in every hundred were common concrete nouns used as the names of familiar objects. The nouns in the other classes of subject matter were in practically every case, either abstract or fraught with generalized connotations.

The discussion of the last four questions may be summarized by briefly describing the characteristics of easy and difficult reading material disclosed in the data of the four preceding analyses. Easy reading material as embodied in the fiction passage is composed of more short words and fewer long words than appears in more difficult passages. Many of the words are nouns designating familiar and concrete objects of everyday experience. The sentences in comparison with other classes of content are short. Finally, there are about as many ideas in easy as in more difficult types of material; they are, however, of a different quality.

Difficult reading material as typified in the passages from psychology and physics contain fewer short and more long words than easy material; in both the psychology and physics passages sentences are longer and more complex—especially so in the psychology passage. In both cases the nouns do not refer to definite concrete and familiar objects, but contain abstract and generalized meanings. Technical terms are employed in the psychology and physics passages. As would be expected from the character of the vocabulary and the sentence structure, the ideas are no greater in number than in less difficult types of passages, but they are more technical, abstract, and generalized in quality. The elements that distinguish the moderately difficult passages from easy passages are longer words, longer and more complex sentences, and more abstract and generalized ideas. The same factors differentiate the moderately difficult passages from passages of still greater difficulty.

CONCLUSIONS

1. Different types of reading material represent different levels of difficulty. In this investigation the fiction passage occupied the easy level; the social science passages occupied the intermediate level; while

the psychology and physics passages in the order named appeared at the difficult level.

2. Analysis of the passages indicates that the easy material is characterized by the short simple sentence structure and easy familiar vocabulary; while the difficult material is characterized by a technical, unfamiliar vocabulary and a complex sentence structure. All of the types of material contain about the same number of ideas per hundred words.

It has been the purpose of this report to present merely the quantitative results of this investigation; nevertheless, a final comment by way of application is in order. Increasing stages of maturity in reading are marked by the ability to read passages of increasing difficulty. If more were known about the specific features which differentiate easy from difficult subject matter, training to increase reading power would cease to be the vague general rehearsal that it often tends to be, and it could be directed to the development of those definite processes which in appropriate combination constitute the mature reading activity.

MICHIGAN SPEED OF READING TESTS

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A need for more reliable tests for speed of reading has been felt both in researches concerning legibility of type and studies of improvement of reading ability. This article reports two steps in the development of tests for measuring reading speed of material of the fourth grade level. The first step was the drawing of ideal specifications and the preparation of the content. The second step was administration of tests to approximately 3,000 persons, and the calculation of age and grade norms, of practice effect, of absolute zero, and of individual and group variability.

SPECIFICATIONS AND CONSTRUCTION

A test was desired which would have the following specifications for the reasons indicated:—

1. *Equal Units of Performance.* This was desired because comparisons were to be made between various parts of the tests, and between various age groups.

2. *Small Chance Success.* The elimination of chance is an important factor in accurate measurement of individuals. The chance successes should be the same for rapid and for slow readers.

3. *Normal Reading Procedure.* Measuring techniques which interrupt the reading process probably introduce constant errors.

4. *Small Range of Vocabulary and Information.* This specification would make the test results depend principally on the mechanics of easy reading rather than detailed information, and allow the test to be applied as a speed test to a wide range of abilities.

5. *Optimum Length.* The length of such a test should be regulated to give a fair sample of ability rather than just an initial spurt, and in certain cases where desired, to give a measure of fatigue.

6. *Equivalent Forms.* These were desired to allow comparisons of speed and accuracy under various conditions.

7. *English Language.* The subjects for the most part read only English.

8. *Objectively Scored.* Scoring should be definite and unambiguous.

A survey of reading tests available showed that the large majority had unequal units, or large chance factors, and none seemed long enough. Two forms were found which illustrated a reliable measure-

ment technique, the *Chapman-Cook Speed of Reading Test*[1] and the *Minnesota Speed of Reading Test*[2]. The former, however, seemed much too short, and the latter was too difficult. Two new forms were, therefore, constructed, called the *Michigan Speed of Reading Tests I and II*, following the Chapman-Cook plan. Each form consists of one hundred 30-word sections of similar complexity. In each section there is one word in the last part which spoils the meaning of the first part. The task is to find the "wrong word" and cross it out. In order to do this it is necessary to read nearly the whole paragraph, for each part alone makes sense and it is only by comparing the two halves that the "wrong word" is found. The words in the tests were chosen with few exceptions from the first 5,000 of Thorndike's *Teacher's Word Book*.[3] The subject-matter is taken from school and home situations common to third- and fourth-grade children. These tests were compiled from items which were tested in the following manner:

1. Three hundred items were made up and typed on separate cards.
2. Five college students and five sixth-grade children were timed with a stop watch on solutions of each item. The items were rotated in blocks of 25 to eliminate the effects of practice.
3. Those items which varied by .6 seconds from the average of the block were either eliminated or revised so that they were nearer the average in difficulty.
4. Finally 200 items were separated into two piles in a random order and printed in identical fashion.
5. The two forms were tested for equivalence by rotating the order of presentation in ten minute periods with nearly equivalent groups of students, 9 to 20 years of age. The results shown in Table I indicate that these forms are practically identical in difficulty for these age groups. There is an improvement from the first to the second test which depends somewhat upon the ability of the group ranging from .6 to 5.0 items.

ADMINISTRATION AND INTERPRETATION

These two forms were then administered under classroom conditions to fairly normal samples of students from third grade to college seniors

[1] *Chapman-Cook Speed of Reading Test.* Philadelphia: J. B. Lippincott Company.

[2] *Minnesota Speed of Reading Test.* Minneapolis: Educational Test Bureau.

[3] Thorndike, E. L. *Teacher's Word Book*, New York: Teachers College, Columbia University, 1921.

TABLE I

EQUIVALENCE OF FORMS I AND II

Age	Number	1st Test Form	Mean	S.D.	2nd Test Form	Mean	S.D.	Mean Difference 2nd—1st
9 to 9.9	142	I	20.1	8.6	II	22.3	9.7	2.2
10 to 10.9	111	II	25.4	9.2	I	29.3	9.1	3.9
11 to 11.9	97	I	34.6	10.1	II	35.2	9.8	.6
12 to 12.9	168	II	37.8	11.2	I	38.9	10.3	1.1
13 to 13.9	74	I	43.7	11.2	II	44.9	12.4	1.2
14 to 14.9	63	II	51.7	12.3	I	54.6	12.0	3.9
19 to 19.9	104	I	70.3	14.2	II	74.8	13.6	4.5
19 to 19.9	102	II	72.1	16.3	I	77.1	15.1	5.0

in Ann Arbor, Michigan. Ten minutes were allowed for each form and there was a three or four minute interval between tests. The results are shown in part in Table II.

TABLE II

GRADE NORMS FOR MICHIGAN SPEED OF READING TEST
(10 MINUTE PERIODS)

Grade	April Mean Age	Number	1st Test. Form I Mean	S.D.	Coefficient of Variation	2nd Test. Form II Mean	S.D.	Coefficient of Variation	Percent correct Test I	Test II
3 B	8.6	24	4.6	3.9	84.9	6.2	4.8	77.4	39.2	40.1
3 A	8.8	33	10.9	7.6	69.7	14.5	7.3	50.3	61.1	60.3
4 B	9.0	114	16.6	10.1	60.2	18.1	9.4	51.9	70.7	69.8
4 A	9.6	159	21.3	9.4	44.7	23.2	8.7	37.5	71.3	72.7
5 B	10.3	143	21.8	11.6	53.7	24.1	9.3	38.6	81.4	81.9
5 A	10.7	179	26.3	8.4	31.9	32.0	9.7	30.2	79.6	80.3
6 B	11.6	178	35.1	9.3	26.5	37.4	10.2	27.3	84.1	84.0
6 A	12.0	204	35.7	9.9	27.6	38.7	10.0	26.4	86.3	87.1
7 B	12.4	57	37.8	11.4	30.1	43.5	10.5	24.1	87.0	84.2
7 A	13.1	70	42.1	12.6	29.8	46.2	10.3	22.2	81.3	86.7
8 B	13.7	27	46.4	10.1	21.7	48.8	10.8	22.1	76.8	84.1
8 A	14.5	30	51.2	11.9	23.1	54.2	10.6	19.6	84.7	89.8
9 B	15.2	48	50.8	13.4	23.1	56.0	10.6	18.9	88.4	91.3
9 A	15.6	60	54.7	12.7	23.2	58.3	11.1	19.1	84.3	86.2
10 B	15.9	42	54.3	12.9	23.7	60.5	11.8	19.5	73.4	76.5
10 A	16.4	28	59.1	13.8	23.3	62.1	11.5	18.5	75.7	80.3
11 B	17.1	30	61.0	11.5	18.8	64.4	12.0	18.6	83.1	82.8
11 A	17.6	28	62.2	10.7	17.3	65.7	11.9	18.1	82.1	87.5
12 B	17.9	30	63.9	13.8	21.9	67.6	12.3	18.2	90.4	92.4
12 A	18.7	28	66.7	12.1	18.2	68.3	12.5	18.3	91.7	94.3
Freshman	19.2	316	70.6	14.3	20.1	72.4	11.2	15.4	93.2	96.4
Sophomore	20.0	415	73.1	10.4	14.2	75.7	9.7	12.8	92.1	95.9
Junior	21.1	98	76.5	9.8	12.8	80.3	8.5	10.5	97.8	97.4
Senior	22.6	87	82.3	9.9	12.0	86.9	7.1	8.1	96.1	97.7

The means show a sharp rise from the 3rd to the 4th grade, a nearly straight line improvement from the 4th to the 10th grade, and thereafter a curve of decreasing increments. Roughly summarized the beginning seventh grader does twice as much as the fourth grader; the tenth grade student, three times as much; and the college junior, approximately four times as much.

The dispersions of groups as indicated by the standard deviations (S. D.) also increase with age but not as rapidly as the means. Hence the coefficients of variation drop from approximately 60.0 at grade 4B to 12.0 for college seniors.

Test I generally shows a slightly smaller mean and slightly greater standard deviation than Test II, consequently the coefficients of variation $\frac{\text{S D}}{\text{Mean}}$ tend to be smaller for Test II. The mean differences are not very great; they tend nearly the same for all grade groups which indicates that the younger students improve from first to second test relatively more than the older student. The reliabilities of these tendencies appear even smaller when one uses the absolute zero of performance instead of the raw score zero as a basis of calculation. This is essential because it is quite universally agreed that such a raw score zero is not a zero of development of the factors which contribute to success.

The absolute zero was calculated using Thurstone's[4] Technique on grades 5 to 9 inclusive. The older grades were omitted from this calculation because they were considered to be skewed in the usual manner of grade grouping. The younger grades were omitted because they contained a considerable number of zero scores. This calculation places the most probable absolute zero at 42.3 items below the raw score zero. In estimating relative improvements of various groups, mean scores should probably be calculated from absolute zero.

The reliability as measured by the uncorrected correlations between equivalent test forms, Table III, ranges from .653 to .94 with the mean reliability at .87 for single age groups. There is a tendency for the younger students to show more variation in position than the older. This probably points to more changes in method, motivation, distractions, etc., among the younger than the older students.

The tests have also been used to measure individual variations of college students during each five minute interval of a twenty-five minute

[4]Thurstone, L. L. "The Absolute Zero in Intelligence Measurement," *Psychological Review*, XXXV (1928), pp. 175-197.

TABLE III

CORRELATIONS BETWEEN EQUIVALENT TEST FORMS
(10 Minute Periods)

Age	Number	Product Moment Correlation
9 to 9.9	142	.653
10 to 10.9	111	.795
11 to 11.9	97	.846
12 to 12.9	168	.817
13 to 13.9	74	.924
14 to 14.9	63	.796
18 to 18.9	206	.943
19 to 19.9	158	.918

test, and also the correlation with the Chapman-Cook Form A. Table IV shows that the prediction of *Michigan Speed of Reading Tests* from

TABLE IV

CORRELATIONS BETWEEN READING VARIOUS PERIODS
(154 College Sophomores)

	Variables	Periods 2	3	4	5	6	7	8
1.	Chapman Cook Test 1.75 minutes	.537	.462	.473	.351	.361	.461	.442
	Michigan Speed of Reading							
2.	1st 5 minutes		.761	.631	.612	.601	.631	.621
3.	2nd 5 minutes			.794	.741	.683	.687	.691
4.	3rd 5 minutes				.791	.754	.671	.702
5.	4th 5 minutes					.849	.631	.712
6.	5th 5 minutes						.610	.718
7.	1st 10 minutes							.874
8.	25 minutes continuous							

the Chapman-Cook Test, which was allowed 1¾ minutes, with the subsequent periods is very poor, .35 to .46, and becomes less reliable the longer the subsequent test. College students' reports indicate a large number of changes in method during the first five minute period, which properly causes changes in rank.

A study of individual variations showed some of the reasons for these low predictions. Most of the literary college groups contained approximately 11 percent of students who were at least ½ S. D. below the mean of the first 5 minute period, and who excelled the mean in the fourth 5 minute period. About 8 percent exceeded the mean by at least ½ S. D. during the last 5 minute period and failed to attain the mean on the fourth and fifth 5 minute periods. These tendencies to start *fast* or start *slowly* may be due in part to differences in training and

temperament. Thus it was found that a group in an engineering course where great emphasis was placed on accuracy of detail had a much larger proportion of slow starters than an Arts college group. The possibility of selecting equivalent groups on the basis of a short test is thus very small, unless such cultural and training factors are well controlled.

SUMMARY AND CONCLUSIONS

1. Two speed of reading test forms called the *Michigan Speed of Reading Tests* were composed, following the Chapman-Cook plan, for use in studies of legibility of type and reading ability of students.

2. In each form of the *Michigan Speed of Reading Tests* there are 100 items, taken from the vocabulary and information of the fourth-grade level. These items were selected from a larger number on the basis of carefully controlled time trials.

3. Norms which were collected from two ten-minute trials of approximately 3,000 persons, from 8 to 20 years, showing practice effect, absolute zero, and individual and group variability.

4. On continuous 25 minute tests of 150 college students, the individual variations during 5 minute subdivisions were so large that the correlation between the first and fifth 5 minute periods was only .601 and between the first 2 minute and the last 5 minute work, .361. Tests shorter than 5 minutes in length should, therefore, not be used for equating groups, and 10 minute tests are preferable. For reliable individual measurement two 10 minute tests are recommended.

EDITORIAL

THE CUMULATIVE EFFECTS OF THE POLICY OF NON-FAILING

Not many years ago it was the common practice to fail large numbers of pupils in the primary grades. For example, in 1915 in one large city 26 percent of all first grade children were failed in grade 1. The variations in failure from school to school were enormous, ranging from less than 2 percent in one school to over 80 percent in another. Large numbers of children were also failed in succeeding grades, although not as many as in the first grade. The result of this program was excessive overageness and the early elimination from the schools of large numbers of pupils.

This policy of excessive failure has been dropped in most schools because of the human waste involved. City after city now reports a very small percent of failure, even in the primary grades. The tendency appears to be to promote on an age basis, so that pupils may be kept fairly homogeneous according to their chronological age and social group. No longer are pupils required to repeat a grade because of failure to meet more or less arbitrary standards of achievement. Recent experimental evidence shows that failing pupils who are promoted to the next grade make a larger growth in achievement during the next year than similar pupils who are required to repeat the work of their present grade, possibly because of the stronger stimulation.

This policy of non-failing is beginning to raise serious instructional problems which should be carefully investigated. Dolch in his article in this issue points out the fact that large numbers of non-readers and weak readers are beginning to pile up in the middle grades of the elementary school. Special adjustments of many kinds are being made for them. Hospital classes, diagnostic clinics, and guidance units are being tried out. Minneapolis has recognized this problem and is trying out a program in which any definite plan of gradation in the first three grades is being eliminated. Pupils are being grouped on the basis of their needs. In this way it is possible to make special provision for the

fairly large group of non-readers found in some schools. In a few cities the plan of ability grouping is being developed, while in others in which it has been tried it is being dropped or greatly modified. Shifts are being made in the curriculum because of the inability of many pupils of relatively low mental capacity now in the intermediate grades to master the present content. For example, there appears to be a quite definite tendency to move up the contents of the arithmetic curriculum a half grade, in some cases even a whole grade, in spite of the fact that for many pupils of average or higher mentality the present grade placement of topics is quite satisfactory. This simplification of the curriculum can be carried to unwholesome lengths. There may be some justification in the criticism that we "are lowering our standards" by following such a program.

The effects of this policy of non-promotion are being felt in the high school and even in the college. Common sense tells us that many pupils in high school and college are attempting courses clearly beyond their level of ability. Formerly such pupils were arbitrarily failed and many of them summarily dismissed. The inadequacy of such a program is being recognized in an ever growing number of higher institutions. Many kinds of special adaptations are being made in colleges to aid in the more effective guidance and placement of students. All of these plans should be carefully evaluated.

It is thus clear that from the first grade through the college the cumulative effects of a policy of non-failing are becoming increasingly potent in their bearing on the curriculum and on instructional practices. The systematic analysis of their implications and their experimental evaluation afford a new and significant field for research in education.

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REVIEWS

Address all communications relative to book reviews to Editor Kai Jensen, University of Wisconsin, Madison, Wisconsin.

TROW, WILLIAM C., EDITOR. *Character Education in Russia.* Foreword by George S. Counts; translation by Paul D. Kalachov (Ann Arbor: Ann Arbor Press, 1934), 199 pp.

Aside from a two page foreword by George S. Counts and a nine page introductory chapter by Dr. Trow, this book is made up of six chapters by Russian authors. These were apparently written for home consumption rather than for foreign readers. The book is not a general discussion of character education nor even an account of the whole range of systematic moral education in Russia; it is a description of the Young Pioneer organization in the USSR and recommendations for the better conduct of this organization.

The Young Pioneer organization is analogous to the Boy Scouts but is less military in pattern, performs activities of a much more realistic work-type, and is more definitely coördinated with the State. It is sometimes called the third communistic shift, the first shift being the Communist Party and the second shift an organization of young Communists called Komsomols who are just above the Young Pioneers in age level. The Young Pioneers are definitely apprentices in the operation of the communist order, and the basic objective is to train them for the management of the soviet republics as they emerge into adulthood. Since the chapters were written for home consumption, they are full of propaganda for the support of communist morale. This may somewhat try the patience of an American reader even though he is, like the present reviewer, disposed to be sympathetic toward the Russian experiment.

Of course we in America could not take over the Young Pioneer pattern as described in this book; its character is determined by the particular economic regime into which it fits. But it is illuminating to see the pedagogical principles relating to self-activity, learning through doing, democratic discipline, etc., with which we are also struggling, tested and adapted by a people who are self-critical enough and honest enough to try all things and hold on to those which are true. Some of us have been feeling for some time that, if we are to promote healthy growth among our young people, we must find a way of paralleling school training with participation in the real work of society—giving them a serious, constructive part in social planning and execution instead of mere reflection and detached problem solving — permitting them to try themselves in making useful goods instead of only playthings. This very thing the Young Pioneer organization is accomplishing under almost ideal conditions. How we could find in American society a way to do a corresponding thing is a problem that should challenge our best thought. While, then, we cannot take over the particular techniques described in this book, the procedures and

aspirations there displayed should stimulate our own search for methods that we may make similarly effective, so far as the limitations of our type of social organization permit. CHARLES C. PETERS
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Intelligence of Scottish Children: A National Survey of an Age Group. Publications of the Scottish Council for Research in Education V (London: University of London Press, Limited, 1933), pp. X + 160.

The principal significance of this volume is that it provides the first data on the intelligence level of Scottish children. Hitherto Scottish educators were dependent upon distributions of mental ability based upon American and English pupils.

The scope and reliability of the data will be grasped through the statement that 87,498 children of ages 10½ to 11½ years were given a group mental test, thus providing a very extensive sample of a single age group. This sample was even more complete than is ordinarily the case since all private schools and institutional cases were included; only blind and deaf children being omitted. The group mental test, as finally used, contained two pages of picture items and five pages of "omnibus" test items of the familiar verbal types. The test was an adaptation of one of the annual Moray House Tests devised by Godfrey H. Thomson, who, it should be stated, is responsible for the very excellent and complete statistical analysis of the records.

In addition to the 87,498 group examinations, 1000 children (500 boys and 500 girls) were given also the Stanford-Binet individual test. This sample of 1000 attempted to include the same geographical and urban-rural populations as obtained in the main group. To some extent this aim was not fully realized. The *mean* individual I. Q. for the 500 boys was found to be 103.0; for the 500 girls, 100.2; and for both sexes 101.6 (as compared with Terman's *median* of 99). The correlations of individual and group test scores were computed as .80 and .76 for boys and girls, respectively. In 99 cases where the same examiner gave the individual tests, the correlation was .84 + for each sex.

Chapter IV describes the group test in detail but it seems unnecessary to review this section here. Chapter V compares at great length the individual and group test results, and particularly the question of bias in the main sample. The statistical conservatism of this section is to be commended. After consideration of four methods of analyzing for bias, one of the Pearson "selection-formulae" was adopted. From this method it was estimated that the mean I. Q. of the *whole* age group of Scotland would prove to be 99.9 for boys and 98.5 for girls. After scrutiny of all data on possible selective factors, the report states (p. 106): "———we propose, therefore, to adopt as the most probable value for Scottish children——

	Boys	Girls
Mean I. Q.	100	100
Standard deviation	17	16"

The variabilities suggested are higher than those hitherto assumed, e.g., Terman's original standardization suggested 13 points; and in Vol. III of *Genetic Studies of Genius*, 15 points. The report concludes, "If, therefore, we take I. Q. 90 to 110 as representing the range of the 'average' child, somewhat *less* than half of the school population are in this sense average, and not somewhat more than

half, as has hitherto been assumed." (P. 106)

The reviewer makes no mention here of several minor studies which were also carried on except in the one case of a conclusion that "test wiseness" is equal to about three I. Q. points.

In general there is so much of praise which might be written and so little of negative criticism that the latter may be ignored save for the mention of an erroneous quotation of a well-known book title and the neglect, in the reviewer's opinion, of certain statistical factors in the section on the comparisons of the variability of Scottish children with the figures obtained by American psychologists.

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WHITCRAFT, LESLIE HARPER. *Some Influences of the Requirements and Examinations of the College Entrance Examination Board on Mathematics in Secondary Schools in the United States.* Contributions to Education, No. 557 (New York: Bureau of Publications, Teachers College, Columbia University, 1933), pp. X + 115.

The influence of College Entrance Examinations has long been a controversial subject. Most of the discussions have been personal opinions of individuals who either favor or object to this system of examining. The above contribution to the subject attempts to collect these opinions and draw some conclusions which it is hoped will lead to improvement of the present plan.

The method employed in the study consists of analyses of questionnaires sent to teachers, superintendents, curriculum experts, and educators of note. Analyses were also made of the questions of the examinations, of the prefaces of authors of mathematics textbooks, and of courses of study.

In general, the findings agree with common experience. There is evidence that the examinations have wide influence, some of which is good and a great deal of which is very bad. Among the good influences may be mentioned the standardization of mathematics courses throughout the country during the early high school period, the stimulating of action among teachers responsible for bringing their pupils safely through the examinations, and the elimination of obsolete material. These influences have not been as effective as they might have been because the examinations have been lagging behind established practice of improvements. Thus, the investigator finds that 21 percent of the exercises in algebra A1 have been on factoring, 16 percent on simultaneous equations, and 12 percent on radicals. These three topics have the highest frequency, while such topics as graphical representation, trigonometric ratios, and formulas are way down at the bottom of the list with percentages of 1.3, 1.3, and 1.0, respectively. Furthermore, the examinations have held tenaciously to complicated fractions which are out of keeping with modern trends.

On the other hand, the investigator obtains from his questionnaires a most imposing list of unfavorable influences of the College Entrance Examinations. They are:

1. interference with the best teaching of many teachers

2. limitation of freedom in the choice of materials

3. retardation of creative work which teachers are unable to find time for

4. retardation of progress of pupils

due to too much concentration on preparation for the examinations

5. cause of worry and nervousness on the part of pupils

6. neglect of large groups of pupils for the sake of the few who take the examinations

7. encouragement of attempts to learn by the cramming process which interferes with real education

8. failure to pay attention to the general objectives of education

The study has made a contribution to the discussion of the College Entrance Examination Plan by replacing occasional individual opinion on the foregoing points with summaries of the views of a large group of educators who have given serious thought to these questions.

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SPAULDING, FRANCIS T., FREDERICK, O. I., AND KOOS, LEONARD V. *The Reorganization of Secondary Education.* National Survey of Secondary Education Monograph No. 5 (United States Office of Education, Bulletin No. 17, 1932), pp. VIII + 423.

The movement for the reorganization of the American secondary school system, which had its beginning during the closing years of the last century, and which culminated in the establishment of the first junior high schools at the opening of the second decade of the present century, has spread gradually and somewhat uniformly throughout the United States. The number of reorganized schools in 1930 (the year upon which the data are based) was 5,777, or 26 percent of the total number of public secondary schools. During the decade from 1910 to 1920 very little progress in reorganization was made. A few hundred separate junior and senior high schools were reported in 1922, but in 1925-26 the number of reorganized secondary schools reported was 3,443. This number had increased to 4,199 in 1927-28 and to 5,777 in 1929-30. Particularly striking is the relative growth of the undivided type, raising its rank from fourth to first place during a four-year period. (p. 53) Davis [1], using data reported to the Office of Education shows that during the period 1922-28 the number of separate junior high schools was increased by 1043 percent. Analysis of the data from the Office of Education for the years 1928-30 will show that the percentage increase in growth for the separate junior was 31.2, while the undivided and the junior-senior types increased in number by 47.4 and 24.9 percent respectively.

The careful and scientific appraisal of the practices in the reorganized schools as presented in this monograph of the National Survey appears timely. A movement making the progress that this one has made and being accepted almost universally in theory needs an inventory of its results such as the authors of this study have made. The investigation is reported in three parts. Part I, consisting of eleven chapters subsumed under three divisions, deals with reorganization as it affects the six grades above the elementary school. The first division is concerned with the present status of reorganization including two chapters—"the spread of the movement" and "the results of reorganization in the typical secondary school". (The first chapter of Part I presents the fundamental assumptions, method of study, etc.) The second division, entitled "The Comparative Promise of Various Types of Organization," contains six chapters involving

[1] Davis, C. O. "Trends in Junior-High-School Development," *Junior-Senior High School Clearing House*, VII (February, 1933), pp. 340-350.

detailed comparisons among the various types of reorganized schools, between conventional and reorganized schools, and between small and large schools. A final chapter of this division presents a summary picture of the comparative promise of the various types. The third division contains two chapters summarizing in detail the characteristic features of comprehensively reorganized schools, and presenting a description of special aspects of organization as illustrated in selected individual schools. Part II describes the growth, present status, and relationships of the junior college; and Part III, with chapters on "reorganizations to save time" and "reorganizations to achieve integration", describes the attempts of individual school systems to effect better articulation of the American secondary school units.

The scientific, logical, and painstaking manner in which the authors have approached the problem of reorganization merits the approval of all students interested in the scientific study of Education. The statistical treatment of the data and the very detailed comparison by way of complete analysis will bear the closest scrutiny. Measures of comprehensiveness and consistency of organization were used as criteria for the evaluation of type organizations. Nine specific features of organization, including admission and promotion, organization of instruction, program of studies, extra curriculum, guidance, articulation, teaching staff, supervision, and housing and equipment, served as major items for the application of the criteria of evaluation. By means of the application of these measures to each of the significant features, the investigators were enabled to determine statistically the extent to which one type of organization surpassed another in comprehensiveness and consistency, and the degree in which certain features appeared to be characteristic of a given type. A short quotation from one of the excellent summaries may serve to indicate the nature of the conclusions:

"When schools of the various common types are rated in terms of the comprehensiveness and consistency of their internal organizations, the undivided six-year schools and the junior-senior high schools organized on a 6-3-3 basis stand out above all the other types. The separate three-year junior and senior high schools seem to score whatever advantage they obtain largely, though not entirely, to the size of their enrollments. Unreorganized schools prove superior in comprehensiveness of organization to the two-year and four-year reorganized schools; they are unsuccessful, however, in achieving a consistency of organization comparable to that of the reorganized schools". (p. 119)

This bulletin is a veritable mine of information on secondary school reorganization, and the administrator contemplating a reorganization of his school system may find the data necessary to enable him to decide intelligently which type of school organization will best meet the needs of his community.

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HARDESTY, CECIL DONALD. *Problems and Practices in Housing the Junior-College Program in California.* Southern California Education Monographs, 1933-1934 Series, No. 3 (Los Angeles: University of Southern California Press, 1934), pp. XIV + 153.

This study is particularly valuable coming as it does at a time when junior colleges are being established or contemplated in so many sections of the country.

The author's purpose as stated is to "isolate the problems involved in housing the junior-college program in California, to learn how these problems are being met, and, where possible, to indicate the most desirable solution to the problems". While the data used are localized to California, still there is no respect in which the findings and recommendations would not apply in any locale.

Thirty-two public junior colleges of California—all but the few whose housing problems are decidedly unique—were used as a field for securing data. Since the enrollment in these schools ranges from 29 to 4,466 all problems relative to size have received a fair consideration. Like other monographs in this series, the information was obtained by a questionnaire, a copy of which is reproduced in the appendix of the book. Office records, catalogs, blueprints, personal visits and interviews have supplied necessary supplementary material. All the data have been carefully compiled and evaluated and working formulas for calculating special requirements have been developed. These specifications turned over to an architect should greatly simplify his procedure and, if the judgments of California's junior college administrators have any value, should make it also more effective.

But the study is larger than these details, for it analyzes the educational set-up as to the need for a junior college, which is implied in the four major functions of such an institution, namely, the terminal, the guidance, the preparatory and the adult education functions. If a junior college is needed, it is considered whether it might not better be housed with the high school or whether it should be segregated on its own campus. A copy of this work in the hands of any prospective junior college administrator should make him aware in a very practical way of all the aspects of the housing program.

The purpose of the book is not to be theoretical nor are the conclusions greatly elaborated. The contribution which this book makes to the junior college field is a handbook for administrators wherever the establishment of a junior college is projected, wherever changes in junior college housing are in prospect, or wherever an increased efficiency of present junior college facilities is desired. In each of these cases, it answers definite needs.

JOHN E. CORBALLY
University of Washington

ALLPORT, GORDON W., AND VERNON, PHILIP E. *Studies in Expressive Movement* (New York: Macmillian Company, 1933), pp. XIII + 269.

Most academic psychologists relegate to the realm of casuistry and "hocus-pocus" attempts of graphologists, character analysts and their kin to diagnose traits of personality. American psychologists, particularly, basing their opinion on one or two experimental investigations, have shown a vigorous skepticism toward research in a field which past associations have linked with astrology and the occult. Allport and Vernon have done a pioneering work in breaking through this peremptoriness and revealing a rich unexplored territory which challenges the analytical capacity of even the most exacting experimentalist.

The book describes the methods, results and interpretations of a number of experiments designed to objectively unravel the complex matrix of personality. As the name of the book implies the experiments have been centered upon attacking personality through "expressive move-

ments'' as contrasted with the ''inner'' personality exhibited in ''traits, interests, attitudes or sentiments'' or the personality revealed through the ''perceptions and interpretations of behavior by another''. No claim is made that expressive movement is coextensive with personality, nor is the study an attempt at character analysis. Its object is ''to study peculiarities of expression and the inner dispositions of personality.''

The motor expressions studies include the following: reading and counting, walking and strolling, estimation of known sizes, estimation of distances and angles, arranging Binet cubes, estimation of weights and handshake, tapping and compression of stylus, drawing squares, circles and other figures, handwriting and muscular tension. In addition ratings of the 25 subjects on vocal expression, speed and smoothness of movement, appearance, forcefulness, etc. were obtained from the experimenters, the subjects themselves, and from close friends of the subjects. Measurements of the motor expressions, as well as the ratings, with one or two exceptions, were made more than once to increase the representativeness of the measures and to obtain a basis for estimating reliability. The authors rest their case on the argument that ''wherever reliability or internal consistency is found, we have a presumption of some kind of harmony or integration in the expressive behavior of the subjects''.

Part A deals with the consistency of gesture and style. Some of the results and conclusions of this study follow: (1) The average repeat-reliabilities of the separate tests was + .68. (2) Consistency between different groups of muscles was often as great as that found with identical muscles. (3) No general speed factor was found but there was some indication of three broad speed factors, namely verbal, drawing and rhythmic. (4) There was little evidence for a general motility factor. From the thirty-four variables studied three group factors were isolated and given the names of emphasis, areal and centrifugal. (5) No single factor of individual consistency was revealed. There was some evidence for two composite variabilities, a general and a specific. (6) Intra-individual consistency, which the authors affirm is not always measured by statistical techniques, was further studied by a close examination of all the records for a given individual. Indicators which were thus found to be related, but which did not correlate statistically, were said to reveal psychomotor congruence. Case studies were presented to illustrate this factor.

Theories of expressive movement are discussed in the light of the experimental evidence. The theory of identical elements, and the theory of unique traits are criticized and rejected. The experimental results fit more closely the theories of generalized psychomotor functions and the personalistic theory.

Part B, ''Handwriting and Personality'', presents the case for experimental graphology. An excellent critical review and evaluation of experimental studies is given. The view is taken that handwriting is ''crystallized gesture'' and should furnish a valuable index to the patterns of personality. Three types of evidence are presented to show that ''the deep-lying central dispositions in personality play a part in the determination of handwriting''. As graphology deals more with the ''general features of script and their relations'' than with ''specific and detailed signs'' most of the experiments designed by psychologists to test its validity have not given the graphologist sufficient scope in which to apply his

methods and procedures. The sorting and matching methods for validating graphological analyses of personality are critically evaluated. Two experiments are described in which graphologists and psychologists coöperated in testing graphological techniques under rigid experimental conditions. The results included diagnoses somewhat above chance but not as highly favorable to graphology as other experiments cited by the authors.

Mention should be made of certain limitations of the study, some of which are acknowledged by the authors. Many of the conclusions of the first experiments were based upon constants obtained by the Spearman-Brown formula. In no instance do the authors show that the necessary conditions of the formula are met by their data. A cursory examination of the data indicates that these conditions were not fulfilled. The formula for the average intercorrelation between all related ratings or all related measures demands equality of means and sigmas among the separate variables. This condition was only remotely approached by the data of Allport and Vernon. Most of the raw coefficients were small, the authors depending upon correction formulas to boost up the constants to more acceptable sizes. A stronger case for expressive movement as a means of diagnosing personality would result if more reliable original measures were obtained. The reliabilities are not exceptionally high considering the amount of averaging and combining of the original scores and the fact that many of the coefficients were repeat-reliabilities. Many psychologists would attempt a case for specificity of function with data showing no greater consistency than manifested in these experiments. It must be admitted, however, that the corrected reliabilities in the studies of Allport and Vernon are considerably higher than those obtained by previous investigators studying similar functions.

C. W. BROWN
University of California

LINDSAY, J. ARMOUR. ***Annual and Semi-Annual Promotion with Special Reference to the Elementary School.*** Contributions to Education, No. 570 (New York: Bureau of Publications, Teachers College, Columbia University, 1933), pp. VII + 170.

This monograph presents in a scholarly way most of the theories and arguments supporting both semi-annual and annual promotions in the elementary schools. Pertinent facts bearing on the validity of these theories and arguments have been gleaned from a number of sources and are cited as evidence favoring one or the other of these promotional schemes. The study is different from the typical doctor's thesis of recent years in that it does not exhibit a mass of data gathered by the author himself. Rather the author makes use of the studies and writings of many others and from these attempts to determine what values inhere in each of these promotion periods. The method used in evaluating the data and arguments is that known as the method of residuum differences, a method which should have a wider application in view of the inconclusive nature of much of our educational research. The whole study reflects the recent trend of requirements for graduate theses in which the candidate is urged to analyze some educational problem as thoroughly as his time and ability, and the existing literature will permit.

When the 47 arguments are analyzed as they affect the traditional school it

appears that in 9 instances semi-annual promotions have slight advantage; in 4 instances annual promotions have a slight advantage; while in the remaining 34 instances neither type is favored. For the newer transitional type of school, the evidence is of a similar nature.

An excellent and extensive bibliography is appended.

M. J. NELSON
Iowa State Teachers College

Vocational Guidance in Engineering Lines. Elicited and Edited by the American Association of Engineers, J. A. L. Woddell, Chairman (Easton, Pennsylvania: Mark Printing Company, 1933), pp. XXXIV + 521.

Vocational Guidance in Engineering Lines, edited by the American Association of Engineers, written by leading engineers and guidance authorities in the field and endorsed by industrial leaders, economists and statesmen is without doubt the outstanding offering in the realm of practical and functioning guidance material in the field of engineering. It could be justly called the answer to guidance workers' prayers because authentic, vital, up-to-the-minute information regarding the various lines of engineering endeavor has hitherto been sadly lacking in a guidance worker's library.

An idea of the diversification of the material offered can be gained by a glance at the first and last items of the 16 page, double column, fine print index. The first item under A is "Accounting, Importance of, 370", and the last item under Z is "Zuder Zee, 387". When it is kept in mind that all this divers material is presented by admitted leaders in the field and that it covers not only activities in the profession but also includes lists of qualifications needed for success, statements as to training and education needed as well as methods of securing them, compensation, employment conditions and statistical material as to the present extent of the profession, it is readily realized that the American Association of Engineers has made a most notable and valuable contribution to practical engineering guidance in our schools and colleges. Quite fittingly, this text enables a guidance worker to attack his problem of guidance for engineers from an engineering view point. He has at hand information, formulas and data needed for his task.

The guidance value of "Vocational Guidance in Engineering Lines" is further enhanced by chapters on vocational guidance by the editors and by Dr. Kitson. There is also a challenge to engineering leadership by Stuart Chase, while the final chapter, "Resume and Conclusions" by the editors, presents a challenge and self-measuring stick to the prospective engineer that makes a fitting climax to a remarkable volume. This book should be used by all interested in guidance as a text or source of material in every college and high school.

The American Association of Engineers deserves high commendation for the successful completion of a tremendous task. It is to be hoped that this organization will provide revisions and additions as needed at future dates to keep the volume vital and up-to-date.

H. W. PAINE
University of Toledo

To the review editor:

With regard to Professor H. M. Johnson's review of my *Story of Scientific Psychology* in the September issue of this Journal, may I state that I am deeply grieved concerning the errors of historical citation. Of course such errors never

occur in the books of really scholarly men. This book was not intended to be used as a text, and a considerable sacrifice of technical terminology and phraseology was considered justified in addressing readers not trained in the field. I must protest when the errors are used to carry conviction for Professor Johnson's misrepresentation of my logical position.

In spite of the implied error in the age of Hertz (the actual age was not mentioned) in the Preface, the basic content stands: *pure science research is a valuable antecedent to practical invention.* This point was omitted, in the review, in favor of a criticism of the use of the word "doddering." There was neither time nor space for an extended discussion of the invisible wave bands, in my Preface.

It is to be suspected that many psychologists will object to my suggestion that there may be variable hereditary bases for mental processes. It seems to me that the question is reasonably debatable and it is a rather severe disposal to cast it under "Errors of Fact." I have similar objection to several other items in Professor Johnson's review.

Adrian and Zotterman were disposed to believe that they had secured records of impulses from single neurones. I discussed theoretical extensions of the conclusions of these experiments, considering nerve tracts on which there was no available experimental evidence. I tried to leave the impression that this was a *hypothetical extension.* I was very much surprised to find Professor Johnson treating my statements as assertions of fact, especially in the paragraphs dealing with the auditory mechanism and the Doctrine of Specific Energies. I cannot believe that it is reprehensible in any science to make *provisional* extensions of theory from incomplete evidence.

Nowhere in the book have I tried to belittle deductive reasoning or to support experimentation without plan or purpose. The imputation is a most violent misrepresentation of my position and practice. I was trying to drive home the idea that *deductive reasoning may be perfectly fallacious when it is used without a careful study of the genesis of major and minor premises.* Is this an "Error of Fact" or an "Error of Reasoning"?

Certainly I presented "laws" of color vision without complete consideration for all of the interrelated variables. So also has every textbook in the subject. A brief treatise cannot make every qualification. It is ridiculously easy to be critical on this level.

It is perfectly feasible to make a visual area appear either black or white without altering its absolute intensity. I take it that Professor Johnson objects to my mode of expression, and not to the experimental reports. The same holds for my assertion that "a cold object is a warm object."

I am sure that Professor Johnson was trying to be honest and certainly his motives are the highest. I am not trying to escape censure for my real errors, for which I must accept justifiable publicity.

Lehigh University. ADELBERT FORD

RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to A. S. Barr, University of Wisconsin, Madison, Wisconsin.

BULLETINS

CRAYTON, SHERMAN G. *A Proposed Program for The Care and Education of Kentucky's Handicapped Children.* Based upon Current Practice and Philosophy within the State and throughout the United States (Lexington, Kentucky: Bureau of School Service, University of Kentucky, 1934), 268 pp.

This bulletin contains twelve chapters as follows: introduction, the care and education of blind and partially sighted children in the United States, the care and education of blind and partially sighted children in Kentucky, the care and education of crippled, cardiac, and tubercular children in the United States, the care and education of crippled, cardiac, and tubercular children in Kentucky, the care and education of deaf and hard-of-hearing children in the United States, the care and education of deaf and hard-of-hearing children in Kentucky, the care and education of socially maladjusted children in the United States, Kentucky's provisions for the care and education of socially maladjusted children, the care and training of feeble-minded children in the United States, the care and training of feeble-minded children in Kentucky, and recommendations for the reorganization of Kentucky's program of care and education for handicapped children. Bibliography.

CYR, FRANK W., AND OTHERS. *Supervised Correspondence Study* (Scranton, Pennsylvania: International Textbook Company, 1934), 66 pp.

This bulletin presents a report of a conference on supervised correspondence study treating the following topics: history of supervised correspondence study, the place and purpose of supervised correspondence study, guidance and supervised correspondence study, the local supervisor, the selection of well-constructed courses, accrediting supervised correspondence courses, standardizing cost accounting, initiating a program of supervised correspondence study in the local school, summary and problems of future development. Bibliography.

DUROST, WALTER N. *The Development of A Battery of Objective Group Tests of Manual Laterality, with Results of Their Application to 1300 Children* (Worcester, Massachusetts: Genetic Psychology Monographs, October, 1934), 335 pp.

This bulletin contains a discussion of (1) The major problems facing investigators of manual laterality, (2) Nature of tests used with results of preliminary trials, (3) Revision of the test battery and administration of revised battery, (4) The left-right criterion questionnaire, (5) Distribution curve of handedness, (6) Handedness related to chronological

age, intelligence, school achievement, and conduct for children 9-15 years of age, (7) Specificity of handedness, and (8) Summary, conclusions and suggestions for further study. References.

LITTWIN, MAXWELL F. "An Experimental Investigation of the Effect of Method of Presentation upon the Imaginative Quality of Descriptive Writing among Elementary School Pupils," Abstract of Thesis, New York University, 1934.

From an experimental study of three methods of teaching the writing and imaginative description; the method of picture study, the method of literary models, and the method of sense training involving nine hundred, sixty-one seventh and eighth grade elementary school pupils the author concludes that the sense-training method by which the imagination is stimulated through the avenue of defenses was found to be superior.

MYERS, GEORGE E., AND OTHERS. *The Development of Social Intelligence through Part Time Education: A Study made for the Committee on Part Time Education of the American Vocational Association* (Washington: The United States Department of the Interior, Office of Education, United States Government Printing Office, 1934), IX + 67 pp.

After defining the problem the author discusses the organization, the pupil personnel, the teaching staff, and the curriculum of the part time schools included in this study. Other sections of the report deal with coördination in the part time program; the national recovery act and part time education; social intelligence, and what motivates it; attitudes and their significance; methods, subjects, and activities in relation to the development of desirable attitudes; teaching methods in part time schools; evidences of improvement in relation to the various social contacts; conclusions and recommendations. Bibliography.

REAVIS, WILLIAM C., AND OTHERS. "School Organization," *Review of Educational Research*, IV (October, 1934), pp. 353-444.

The summary of researches relating to school organization are presented with reference to the following topics: units of school organization, structural organization of the American public school system, internal organization of school divisions and the organization of administration. Bibliography.

WHEELER, RAYMOND H., AND OTHERS. *University of Kansas Studies in Psychology* (Princeton, N. J., and Albany, New York: Psychological Review Company, 1933), III + 300 pp.

This monograph contains a series of thirteen papers dealing with various problems in the field of psychology and education, such as, the problem of insightful behavior, an analysis of the relationship between tactual and visual perception, a study in the recall of perceived relations, an experimental study of rhythms, the maturation of college students as evidenced by retests with the National Council tests, the maturation of college students as evidenced by the eight semester grade points, a psychological investigation of the relation of illumination to aesthetics.

EDUCATIONAL ADMINISTRATION AND SUPERVISION

BIGELOW, ELIZABETH B. "School Progress of Under-Age Children," *The Elementary School Journal*, XXXV (November, 1934), pp. 186-192.

This study is based upon one group of 88 children who entered grade one

before they were chronologically 6 years of age and another group of 39 children who entered school when they were between 6 years and six years and four months. The author concludes that a child who is under six years chronologically and whose mental age is under six years has practically no chance to succeed.

BURKE, ARVID, J. "Professional Courses for Secondary School Principals," *Educational Administration and Supervision*, XX (October, 1934), pp. 506-512.

An analysis of the professional course requirements for secondary school principals found in state certification laws and regulations.

ENGEL, E. F. "The Junior College in Kansas," *The Junior College Journal*, V (October, 1934), pp. 3-9.

The author presents an analysis of the number of institutions, enrollments, scholarship records, and problems of the Junior College in Kansas for the fifteen-year period 1919-1934.

LEHMAN, ADIN F. "Legal Principles Governing Corporal Punishment as Administered in Public Schools," *Educational Administration and Supervision*, XX (October, 1934), pp. 495-505.

From an analysis of legislation and court discussions the author concludes that corporal punishment is conferred by usage, is approved through legal decisions and is to be administered in moderation, proportionate to the offense according to the best judgment of the teacher.

RHODE, ELLIS G., AND ANDERSON, H. DEWEY. "The Tenure of High School Principals in California," *California Journal of Secondary Education*, X (October, 1934), pp. 53-57.

From a study of data secured from high school principals in the state of California the authors conclude that the over-supply of certified principals make the chance of securing a position about one in thirty. Once in the profession there is likelihood that the principal may remain in a single school for a long enough period of time or become a definite part of the economic and social community.

METHODS OF INSTRUCTION

BEDELL, RALPH C. "The Relationship between the Ability to Recall and the Ability to Infer in Specific Learning Situations," *Science Education*, XVIII (October, 1934), pp. 158-162.

From an analysis of the test results secured from 324 students in general science courses in Southwest High School, Kansas City, Missouri, and Jefferson High School, Columbia, Missouri, the author concludes that the ability to recall specific facts and the ability to infer a generalized idea from these facts or data are different abilities. Boys are superior to girls in the ability to infer and the ability to infer is a more difficult process than the ability to recall.

BETTS, EMMETT ALBERT. "A Physiological Approach to Reading Disabilities," *Educational Research Bulletin*, XIII (September 19, 1934), pp. 135-140; and (October 17, 1934), pp. 163-174.

After saying that attempts to study reading problems entirely by educational-research methods have proved fruitless, the author presents a discussion of the physiological background of reading disabilities.

JERSILD, ARTHUR T., AND BIENSTOCK, SYLVIA F. "A Study of the Development of Children's Ability to Sing," *The Journal of Educational Psychology*, XXV (October, 1934), pp. 481-503.

This article presents a report of the results obtained from tests of vocal reproduction of pitch administered to four hundred seven children age two to ten years and to sixty-five adults; also the results of a study of the effect of training in vocal reproduction of pitch for twenty-three children, age 3½ to 8 years.

LEGGITT, DOROTHY. "Measuring Progress in Working Skills in Ninth-Grade Civics," *The School Review*, XLII (November, 1934), pp. 676-687.

From an experimental study of certain working skills in the study of social-science material involving forty-two ninth grade pupils and a like number in a control group, the author concludes that in 18 weeks pupils increased in the use of working skills about 50 percent.

MCCLUSKY, HOWARD YALE. "An Experiment on the Influence of Preliminary Skimming on Reading," *The Journal of Educational Psychology*, XXV (October, 1934), pp. 521-529.

From an experimental study in which the author employed university sophomores of Michigan the author concludes that in the majority of the cases skimming accelerates the normal rate of reading.

THORNDIKE, EDWARD L. "Improving the Ability to Read," *Teachers College Record*, XXXVI (October, 1934), pp. 1-19.

The author presents materials relating to the teaching of reading above grade four discussing means and methods, increasing vocabulary, increasing knowledge of construction, ability to manage large units, and the fostering of interest.

TRAVIS, LEE EDWARD, AND JOHNSON, WENDELL. "Stuttering and the Concept of Handedness," *Psychological Review*, XXXI (November, 1934) pp. 534-562.

The authors present a critical review of previous investigations relating to stuttering and handedness from which they conclude that the change of handedness occurs with significant frequency in the history of cases of stuttering. There is more left handedness in the heredity of background of stutterers than of normal speakers.

WRIGHTSTONE, J. WAYNE. "Appraising Newer Practices in Teaching Social Studies," *The School Review*, XLII (November, 1934), pp. 688-693.

From an experimental study involving two groups of thirty pupils each, the author finds an 8.3 point superiority for the experimental procedure which consisted of problems solving derived from current periodicals.

CURRICULUM

JOHN, M. E., AND WAKELEY, RAY E. "Some Social Results of Training in Vocational Agriculture," *The Journal of Educational Sociology*, VIII (November, 1934), pp. 141-151.

From data secured from students and graduates of twelve Iowa high schools, 1922-1927, the authors conclude that while two or more courses in vocational agriculture cannot be expected to revolutionize the opinions and activities of high school students either before or after graduation that such training is associated with less movement from the

home community, more satisfactory occupational adjustment, less active participation in local organizations, and stronger opinion towards farming as an occupation and coöperative marketing.

WEBB, NORMAN E., AND VINAL, W. G. "Subject Matter Topics in Biology Courses of Study," *School Science and Mathematics*, XXXIV (November, 1934), pp. 829-841.

The authors present a topical analysis of the subject of Biology as found in thirteen courses of study.

CHILD WELFARE: GUIDANCE AND DEVELOPMENT

LEHMAN, HARVEY C., AND WITTY, PAUL A. "Vocational Guidance: Some Basic Considerations," *The Journal of Educational Sociology*, VIII (November, 1934), pp. 174-184.

From a study of the results secured from the application of the Lehman Vocational Attitude Quiz given to a group of school children in Topeka, Kansas, and Kansas City, Missouri, and from a study of the United States Census report the authors conclude that the occupations which boys think they will enter simply are not those which they can enter. Many of the occupations which boys wish to avoid will be the very ones which some must enter.

"Speech Retardation," *Child Research Clinic Series*, I, Number 1.

This is the first of a series of case studies of exceptional children prepared by the Child Research Clinic of the Woods Schools, Langhorne, Pennsylvania.

MEASUREMENT, STATISTICS, AND THE METHODOLOGY OF SCIENTIFIC RESEARCH

HENRY, LORNE J. "A Comparison of the Difficulty and Validity of Achievement Test Items," *The Journal of Educational Psychology*, XXV (October, 1934), pp. 537-541.

The author presents statistical data bearing upon the relative merits of five methods of determining the difficulty and validity of achievement test items.

JOHNSTON, J. B., AND OTHERS. "The 1934 College Sophomore Testing Program," *Educational Record*, XV (October, 1934), pp. 471-516.

The committee on educational testing of the American Council on Education presents in this article a list of the coöperating institutions with test results.

KELLEY, TRUMAN L. "The Scoring of Alternative Responses with Reference to Some Criterion," *The Journal of Educational Psychology*, XXV (October, 1934), pp. 504-510.

The author presents a statistical analysis of certain formulae for scoring of alternative responses such as those in the Cowdery and Strong tests.

MISCELLANEOUS

BRAY, WILLIS J. "The Selection of High-School Science Textbooks," *Science Education*, XVIII (October, 1934), pp. 147-151.

The author presents a score card for the selection of high-school science textbooks and illustrates its use by rating a number of textbooks in this field.

BURRELL, JEANETTE, AND ECKELBERRY, R. H. "The Free Public High School in the Post-Civil-War Period," *The School Review*, XLII (November, 1934), pp. 667-675.

The second of a series of articles discussing the free public high school in the post-civil-war period.

RESEARCH NEWS and COMMUNICATIONS

Address all research news and communications to Carter V. Good, Teachers College, University of Cincinnati, Cincinnati, Ohio.

California Projects (State).—Research projects at present under way in the California State Department of Education include:

1. State survey of school building adequacy, an SERA project.
2. Evaluation of reading texts submitted for state adoption.
3. Evaluation of spelling texts submitted for state adoption.
4. Survey of education of exceptional children in California.
5. Survey of status of educational organization and administration in California.
6. Survey of status of student fees in California state teachers colleges.
7. Study of unit costs in California state teachers colleges.
8. Analysis of summer session services and costs of California state teachers colleges.
9. Survey of practices and procedures in student teaching in the privately endowed institutions approved by the state board of education for teacher training.
10. Survey of certification data.
11. Study of number of school districts that would not have sufficient funds for a new school building if they would vote bonds to the full amount allowed by law, namely, 5 percent of the assessed valuation.

The workers under whose direction these studies are being made are Walter E. Morgan, C. M. Hirst, Ivan R. Waterman, Joe A. Burkman, and Evelyn Clement.

Current Research in Long Beach, California.—Under the supervision of the Department of Curriculum and Research, a limited testing program to aid in grade placement and to measure achievement is being carried on by counselors in the elementary and secondary schools. This program varies in different schools, the intention being to meet the needs of the particular school or class. One result to be considered is purely local; it is to discover in terms of standardized achievement tests how the achievement of pupils has been affected by efforts toward integration, and by conditions, especially half-day sessions in tents and bungalows, under which the schools have operated since the earthquake of March, 1933.

As a part of the plan of articulating the elementary, junior high, and senior high segments, all sixth grade pupils leaving the elementary school and all ninth grade pupils leaving the junior high school are to be tested during their last semester in the above segments. The tests used this year are the New Stanford Arithmetic and Reading Tests. The results of these tests, considered with other information regarding the pupil, serve as valuable aids in his guidance and placement in the new segment.

New primary and elementary report cards have just been put into use. Last year was an experimental period in which informal notes were sent home to parents from time to time. The new forms aim to get away from a competitive card, and at the same time give to parents definite

information about the progress of their children in the subjects they are studying. Informal notes may still be sent home between the two reports issued each semester. The new cards were the subject of discussion at the Thanksgiving Teachers' Institute, at which time representatives from all segments of the school system, elementary through junior college, presented their reactions, experiences, and suggestions in group discussion.

All printed and mimeographed forms in use in the secondary schools are being examined. The object is to study the function of each report, to standardize wherever possible, and to reduce unnecessary overlapping. This investigation will make it possible to carry on essential record keeping more economically and at the same time offer an opportunity to reduce expenses where they can wisely be curtailed.

A simplification of the pupil data sheets used in the counselor's office of each school is being undertaken. It is planned to have but one sheet, one side devoted to personal data and the other to test data. The forms will vary slightly in the different segments of the school system. The personal-data side is concerned with brief statements about health, traits, accomplishments, deficiencies, interests, subjects liked best and least, and educational plans. The test-data side of the school record includes scholastic aptitude ratings and achievement tests. Only the results of significant tests are to be recorded; the device of representing scores is to be the percentile method.

Los Angeles Investigations.—During the past year and a half, a great deal of attention has necessarily been directed toward a rehabilitation and housing program due to the March earthquake of 1933. As a result, it has been necessary to curtail a great many administrative projects.

Last year a survey of the entire school system of Los Angeles was undertaken, and as an outcome the Board of Education authorized a reorganization of the administrative set-up of the school system. The schools are now engaged in adapting policies and procedures to this new administrative organization.

At the present time, the Division is working on a revision of the rules and regulations of the Board of Education, and is preparing for use in the schools what may be called an administrative guide—a publication in loose-leaf form which will place in the hands of the principals all administrative policies and procedures that concern administration of the schools and the relationship of the schools to the central organization.

Work is going forward toward setting up Civil Service procedures for non-certificated personnel, and in connection with this study, toward the reclassification of all non-certificated personnel and the adjustment of the salary schedule in conformity with this new classification.

The Division is carrying on a continuous study of transportation facilities in the district, the standardization of supplies and equipment, and expenditures of the Board of Education for the mileage and carfare of Board employees.

Paul E. Webb is Director of the Division of Budget and Research.

Research in Santa Monica, California.—Under the supervision of the State Division of Speech Education, one of the junior high schools is coöperating in a study of the development of speech at this level.

University students are making studies of special cases recommended by the teachers for remedial instruction. Tests are given to these cases and remedial instruction is offered over a period of time, followed by further testing and study.

At the beginning of each semester pupils in the mathematics classes of one junior high school are given diagnostic tests in arithmetic computation and reasoning as an aid in determining the needs of instruction.

At the beginning of each semester I B pupils are given the First Grade Intelligence Test. At the end of each semester the Terman Group Test of Mental Ability is given to 6A pupils before their entrance to the junior high school. The test results are not used for classification purposes, but to give further evidence of each pupil's ability and needs.

In the fall of 1933, pupils in the 3B and 5B grades were selected for study, first, because the 3rd grade is at the end of the primary division and, second, that the 5th grade is near the end of the elementary division. Cases found in the 5th grade in need of remedial help would have another year in which such aid could be given before entering junior high school. All pupils in grades 3B and 5B were tested in reading in September, January, and May. Three forms of the New Stanford Reading Test were used. All cases below grade in reading, according to the test results on the three testings, if not previously examined, will be given physical and mental tests. During the present school year these cases will be tested in reading and further study made of them. Individual and remedial instruction will be given by the classroom teacher whenever possible. Again this fall, a similar study is being undertaken with the present 3B and 5B grades, which is the first part of a second two-year study of reading ability and the part it plays in failure. In addition, the pupils of one first grade class are being studied for reading readiness and ability to acquire reading skill during this grade. The purpose of this project is to lessen the number of failures in the beginning classes in reading.

Clarissa R. Bacon is Research Secretary.

Projects of the International Institute (Columbia).—While individual members of the International Institute of Teachers College, Columbia University, are engaged on research projects of their own, which are referred to below, the Institute itself, under the direction of Paul Monroe, has general supervision of an international inquiry into examinations. This study resulted from the Conference on Examinations held at Eastbourne in June, 1931, when national committees were appointed to conduct investigations into examinations in England, France, Germany, Scotland, and Switzerland. Interim reports already have been issued: an extensive bibliography on examinations in England, a general description of the French system of education with reference to examinations (*Atlas de l'Enseignement en France*), selection of students in Germany (*Schülerauslese*), and *The Intelligence of Scottish Children—A National Survey of An Age-Group.* It is expected that full reports of the investigations will appear within the next two years, together with a summary of the reports by Dr. Monroe. In connection with this inquiry I. L. Kandel is preparing a report on *Examinations and Their Substitutes in the United States,* in which the history of examinations, the scientific attack on their reliability and validity, and the development of the objective new-type tests will be discussed.

The International Institute is continuing its publication of the *Educational Yearbooks* under the editorship of Dr. Kandel. The volume for 1934, now in press, will deal in the main with education in France and Russia. The volume planned for 1935 will take up a subject on which information has never before been brought together, teachers' associations and their work in about twenty countries; it is expected that this yearbook will be published at the end of 1935.

Paul Monroe is preparing an account of the "Ten Years Work of the International Institute".

Ruth McMurry of the International Institute is making a study of the "Education of German Women in the Third Reich".

The following dissertations are being prepared under the supervision of I. L. Kandel:

Russell Galt, "The Effects of Centralization on Education in Modern Egypt".

Amir Boktor, "School and Society in the Valley of the Nile".

A. C. Deve Gowda, "Secondary Education in Mysore".

E. Feingold, "The Ecole Unique".

A. Efron, "A Comparison of the Teaching of Science in France, Russia, and the United States".

O. Shropshire, "The Teaching of History in England".

The following studies are being conducted under the supervision of Thomas Alexander:

Cecilia Bason, "Heimatkunde in the German School".

John W. Taylor, "Education of Youth in Germany in Out-of-School Organizations".

Research at the Lewiston (Idaho) State Normal School.—Three projects are under way at the present time at the Lewiston (Idaho) State Normal School: (1) an attempt to learn from alumni now teaching which elements in their training were found to be most effective in their teaching; (2) a study of salary trends in relation to similar trends in other vocations in Idaho during the past seven years and in relation to the cost of living; (3) a study of entrance tests of intelligence, English, and elementary grade subjects in relation to the prediction of scholarship and teaching success.

The first of these studies is a repetition of a similar investigation made seven years ago, which resulted in some modifications of the normal school curriculum, in that so-called methods courses were eliminated, combined, or reorganized. The present study is an attempt to test the validity of these changes, to ascertain the grades in which teaching has been done each year since graduation, and to determine desirable additional changes to be made in the curriculum.

To these ends a questionnaire has been prepared which includes a check list of required and elective subjects with the request that each graduate indicate which subjects should receive more and which less emphasis. This is followed by a request for a statement as to which subjects were found of especial value in teaching and a list of subjects that should be added to the curriculum.

It is hoped that definite information will be obtained which will help to determine whether a two-year elementary teacher training course should offer special curriculums for primary, intermediate, and junior high school teachers or whether a general elementary course alone is sufficient in preparing teachers for the area served by this institution.

From returns already available, for example, it appears that approximately 65 percent of the graduates were expected to be prepared to teach any or all of the first eight grades, another 22 percent taught in grades 1 to 4, while 10 percent taught grades 6, 7, and 8. Only 3 percent of the alumni had ever had occasion to teach in grade 9. Such facts obviously have important implications as to the type of teacher training that should be offered.

The second (salary trend) study has been undertaken in coöperation with the Idaho Education Association. The necessary data will be obtained from the state directories of education in so far as that is possible. Supplementary data will be obtained through questionnaires distributed by the county superintendents. It is proposed to make separate studies of one-room, two to four room, five to eight room, and nine or more room elementary schools. Separate studies will also be made of high school teachers, elementary principals, high school principals, and superintendents. Information as to living costs, professional expenses, and savings will also be obtained.

The third study, that concerned with the use of entrance tests and prediction, is similar to studies already made elsewhere. It is limited, however, to the elementary field. It will attempt also to be more critical of the reliability and validity of measures of scholastic and teaching success than has usually been the case in the investigations already made. Preliminary data indicate, for example, that the possibility of prediction is increased as the reliability of the criteria is improved.

I. N. Madsen, Director of the Department of Tests and Measurements, is in charge of these studies.

Fort Wayne, Indiana, Studies.—The Bureau of Research and Measurement of the Fort Wayne Public Schools is concerned primarily with problems of the curriculum, of evaluating pupil achievement, of pupil progress, and of special education. Due to restricted appropriations only a limited number of new studies are possible at present.

During the current year continued study is being given to reorganization and evaluation of courses recently developed in social science, arithmetic, and reading for slow-learning pupils, primarily in the field of special education. Other curriculum research deals with spelling in all grades, with evaluation of an experimental method of teaching high school English, and with the development of a test in primary reading. All studies are made in coöperation with teachers, department heads, or principals.

Two lines of testing are carried on, achievement and intelligence. The achievement testing program is planned mainly to assist the teacher in checking on progress and in discovering individual needs. Due to the adoption of a new curriculum, special emphasis is being given this year to appraisal of subject matter. The Bureau is coöperating with teacher committees in preparing informal objective tests. Group intelligence tests are given each pupil at least three times during his school life. Binet-Simon tests are given to children recommended for rapid promotion, or for admission to special education groups, and to children needing special study.

Each semester the percentages are computed by half-grades, and combinations thereof, of pupils not earning promotions and of pupils passed on unsatisfactory or failing grades. Some of these studies have been made in greater detail, dealing

with individual schools, with reasons for non-promotion, and the relationship between intelligence and failure. In general the percentage of non-promotion has decreased steadily.

The special education department this year consists of given special rooms located throughout the city for the younger slow-learning children, a central pre-vocational school for the older boys and girls unable to make satisfactory adjustment in the regular grades, and a class of boys in high school who have progressed beyond the pre-vocational school and some of whom are able to take work in the regular high school classes and to participate in high school activities. The Bureau of Research organizes special education groups and classes, supervises curriculum construction, and supervises instruction through a testing program. In addition it makes such studies as are deemed necessary and useful. Investigation is being made at present to determine the effect of special education upon juvenile delinquency, by comparing the amount of delinquency among slow-learning pupils in regular grades in the public schools and among slow-learning pupils provided with the specialized learning opportunities.

The staff of the Bureau has been reduced this year to the director, a part-time assistant, a part-time psychologist, and one clerk. Flora Wilber is Director of the Bureau of Research and Measurement.

Emporia Projects (Kansas).—The following research projects are in progress for the current year at the Kansas State Teachers College of Emporia:

1. "College Success of Kansas State Teachers College Students in Relation to Rank on Entrance Tests." This project is a follow-up of a study released several years ago. It covers a ten-year period of testing for checking of student success.

2. "College Success of Kansas State Teachers College Students in Relation to High School Success." This study also covers a ten-year period.

3. "Comparison of the Kansas State Teachers College 1934 Freshmen with Freshmen of Ten Years Ago, with Respect to Intelligence Test Scores and Certain Personality Data."

4. "Experimental Studies Anticipating the Revision of the Army Alpha Intelligence Scale."

5. "Study of the Relation of Success of Subjects on Test I of the Army Alpha Intelligence Test between Receiving the Directions Auditorially or Visually."

6. "An Analysis of the Content of Ten First-year Latin Texts."

7. "Comparison between the Success of Students in Rural High Schools Who Live Away from Home and Those Who Travel Daily from Home to School."

The director of the Bureau of Educational Measurements is H. E. Schrammel.

Michigan Studies.—The two chief projects upon which the Bureau of Educational Reference and Research at the University of Michigan is working at the present time are:

1. A survey of the educational achievement of all pupils of school age in Washtenaw County, Michigan. This study was undertaken as a part of the CWA and FERA projects. The tests used in this survey are somewhat unique in that an effort was made to measure: study habits, scientific attitudes, scientific interest, scientific appreciation, social attitudes, social distance, social thinking, vocational interest, and leisure-time activities. The tests were administered to approximately

7000 pupils in Grades 4 to 12, inclusive. The survey is rather unique in that it includes pupils from the rural, consolidated, village, and small-town districts; large districts; and those schools primarily used as centers for teacher-training.

2. The second project is a survey of methods and practices in penmanship in the State of Michigan. Inquiries concerning the extent and values of manuscript writing prompted the survey. An inquiry blank was sent to the schools of the state for information concerning the time-expenditure, methods, and practices of teaching penmanship. At the same time a request was made for two samples of penmanship from the selected cities. The first specimen was obtained by having the teacher write the Gettysburg Address on the blackboard, asking the children to memorize it, and then having them write as much of it as they could in two minutes to give a sample of their handwriting. The second specimen was a page of composition written by the child when his mind was on what he was writing and not on penmanship as such. The children were asked to write on the topic, "An Exciting Time."

Clifford Woody is director of the Bureau.

Newark Department of Research (New Jersey.—The routine program of the Department is based upon a child-accounting program, a testing program, school-building surveys, and financial studies. Special studies are undertaken whenever significant problems are revealed by the data accumulated through this routine program.

Testing programs generally are administered at the beginning of the school term in order that the results may be used in adapting the classroom instruction to the needs of pupils.

To check the progress through the grades, age-grade and grade-progress studies are made in alternate years. The data secured from these routine investigations have revealed serious problems that have been studied more intensively.

Two investigations of promotional problems have been undertaken. The first study was designed to reveal those personal qualities that were associated with retardation. Low I. Q. and achievement and poor ratings on character traits were found to be definitely related to retardation. The results showed, however, that a number of pupils, superior in all of these qualities, were retarded. No significant relationship between health or economic status and grade-progress was revealed. This first study revealed those qualities and conditions related to retardation, but did not indicate whether they caused retardation or vice versa. A second study is being completed, therefore, which will show the effect of retardation upon the rate of learning and the attitude of the child.

To provide data for high school counselors, investigations of the relationship between elementary school success and high school success are being made. One completed study indicates that retardation in the elementary school does not assure academic adjustment in the high school. Pupils with three or four failures during the first two years in high school required more time to complete their elementary school work and, therefore, are older than those pupils with better academic records. The same study shows that pupils with one or two failures are younger than those having no failures. Apparently excessive acceleration in the elementary school may cause some maladjustment in the high school.

Other investigations are in progress to determine the value of intelligence and achievement tests in predicting high school success. These have been under way for only three years and, therefore, final results are not available. The results secured thus far indicate a reasonable correlation between the I. Q. at the time of entry into high school and school marks secured in the first two years. There is, however, a tendency for the correlations to become lower each succeeding term. In one school it was found that the marks secured by children with I. Q.'s above 115 became lower each succeeding term. Since these children had started with excellent marks, it appears that they were not doing school work commensurate with their mental ability. These facts suggest that further guidance and curriculum adjustment are necessary if these pupils are to be stimulated to greater effort.

During this year the Department is attempting to construct a test of social information and attitudes. The purpose of this test will be to determine the child's knowledge of significant events and problems at the end of the eighth grade. It is hoped that some idea of the pupils' attitudes toward these problems also may be estimated.

A study of the work done by teachers outside of school hours is being completed. Its purpose is to discover those activities deemed essential to the presentation of class work, and to secure an estimate of the time required for this outside work.

Eugene S. Farley is head of the Newark Department of Reference and Research.

Educational Research Division, New York State.—In the field of teacher education the Division during 1933-34 has completed two studies: one analyzed the difficulties encountered by beginning teachers; the other reported an attempt to prognosticate the teaching ability of entering normal-school students. The two studies taken together have furnished a valuable guide in the reorganization of normal school curricula. Very little was learned with regard to methods of prognosticating teacher ability.

Research activities in the field of secondary education have been of a miscellaneous nature. A manuscript has just been finished on the problems of the small high school. The first part of this study reviews the research literature on the subject, and the second part analyzes New York State conditions. An attempt has been made to discover whether the subjects taught in high school had any relationship to the type of organization. No relationship was found. Data with regard to number and length of periods in New York State high schools were gathered and distributed. An analysis also has been completed of the Regents records of 10,000 pupils.

Studies have been carried forward relating to the high school-college relationship. These studies are sponsored by a committee representing the high schools and by another committee representing the colleges and universities. The first point of attack was to discover more specifically the difficulties which seem to exist at the present time in this relationship. One of the outcomes so far is the realization that colleges need to be more specific with regard to the training of the students they wish to accept and with respect to the type or types of training they expect to give.

The need of analyses of socio-economic trends and their bearing upon educational

planning is obvious. The Division has started work in this field by analyzing the United States Census reports to determine occupational trends in New York State. Other studies will analyze population movements, and it is hoped that data from the annual reports of other state departments may be analyzed to discover trends which are significant for education.

For several years the Division has prepared a bulletin on needed research in New York State. This year it expects to expand this work and to analyze contributions which have been made during the year as well as point out studies that are needed.

One of the most important fields of investigation in New York State is that of determining how the number of administrative school units may be reduced by the formation of larger units. This problem has been attacked through the intensive study of eleven areas scattered over the State. Each area was made large enough to furnish a sufficient number of pupils for effective elementary and high-school teaching. The administrative set-up was then planned. The next step will be to study an area which will need to be broken up into several large administrative units, and a later study probably will include the area around a large city.

The problem of school organization has engaged the attention of the Division for a number of years. It assumes that the grade organization under which we at present are operating our schools was a product of a philosophy that is now obsolete. The studies under way are attempts to obtain factual data concerning the variability of children of the same chronological age and their educational needs. It is thought that this information is basic to the planning of adequate school units to care for the education of children.

The director of the Division is W. W. Coxe.

Projects of the Ohio Education Association.—For a state with a public school finance problem in as critical a condition as that which prevails in Ohio, it is reasonable to expect that the state organization of teachers will be largely concerned with matters of taxation and increased state support of schools. A policy of widespread publicity relative to the school finance difficulties, likewise, will be a matter of major emphasis. It is, in fact, in these fields that a large part of the research activities of the Ohio Education Association now is concentrated.

For the tax year about to begin, the tax limitation in Ohio has been reduced from fifteen to ten mills. The effect of this reduction, together with the general effects of the depression on the power of local tax areas to support schools, needs to be ascertained. Such information is basic to the development of a comprehensive program for increased support of the public schools by the state. The reduction of the tax limitation carried with it a repeal of all mandated levies for the current operating expenses of schools. Hence, many districts have been forced to go to the people with proposals to vote current operating levies outside of the limitation. For these districts, as well as for those which later will resort to the same practice, it was vital that effective publicity materials be prepared and circulated generally throughout the state.

In spite of the demands made by the school finance crisis, the research activi-

ties on the professional side have not been completely overlooked. During the year an investigation covering supervisory practices in the county school districts has been carried almost to completion. This study undertakes to determine, roughly, how local school heads allot their time to teaching, to supervision, and to building inspection. The amount of elementary school teaching experience and training of the school heads is to be ascertained. An effort is made to learn the extent to which the county superintendent's office serves to coördinate the supervisory activities of the county school district. Certain features of the investigation throw some light on the quality of supervisory leadership evidenced by the county superintendent's office. It is the plan to follow this investigation with a more detailed study of the supervisory activities of the local school heads and of the work of the county office in schools without local supervision.

For three years committees of the Educational Council of the Association have been at work on curriculum studies. It is anticipated that several of these projects—public school music, primary grade arithmetic, and reading—will be completed this year. Other committees of the Council are at work on problems of association membership, district organization, programs, and parent-teacher relationships.

If the experience of the Ohio Education Association is a criterion, the research work of a state teachers' organization must contribute to a considerable extent to the shaping of public opinion. Material must be assembled which directly meets the problems of education and of the teachers of the state. Investigation must serve a useful purpose and the findings must be presented in a form which is intelligible to the general public. Scientific accuracy must be practiced, but complicated techniques and verbiage must be avoided.

B. A. Stevens is director of research for the association.

Lancaster, Pennsylvania, Projects for 1934-35.—Semi-annual studies are made of teaching loads in the junior and senior high schools and of the size of classes in the elementary schools. Such factors as the number of pupils met per week for recitation purposes, the number of pupils met in study classes, the number of recitation and study classes, and other regularly assigned work within the school day or outside of school hours are given consideration. Studies will also be made of the size of classes in the various subjects in the high schools.

Semi-annually, statistical data are obtained for non-promotions according to the grades and schools. Comparisons are made with similar data for previous years. When an exceptionally low rate of promotions is recorded, an effort is made to determine the reason.

One of the junior high schools during the past year has been trying "equivalent" grouping instead of the usual "homogeneous" grouping, which has been used considerably for the past several years. Pupils were roughly grouped upon the basis of their physiological development, but at the same time the groups were kept equal in ability to do academic work. An effort will be made to obtain some information which may indicate the advantages and disadvantages of this so called "equivalent" grouping.

Each year a study is made of costs for the various second class school districts of Pennsylvania. This study is

not used for comparative purposes, but, rather, to determine trends.

Recently there has been completed an investigation which had for its purpose the answering of the question, "Does the study of World History help pupils to understand United States History more readily, especially as it is related to foreign affairs?" This report includes opinions of teachers, as well as data from a controlled experiment.

Testing programs for the year include vocabulary tests in the junior high schools, diagnostic and achievement tests in reading and arithmetic in the elementary field, and the testing of 9B pupils in English, mathematics, and Latin. The vocabulary testing program has for its objective increasing the pupils' achievement in reading by building up their vocabularies. Vocabulary tests technical to the various subjects have been constructed and administered to the pupils. Word lists have been prepared and furnished to teachers. The objective in connection with the testing of 9B pupils is, not only to obtain a measure of the achievement of junior high school pupils, but also to give significant data which may be of value to teachers and principals in selecting pupils for the Opportunity Group in the senior high schools.

The school system also coöperates with outside agencies in connection with possible delinquent or delinquent children. Each case is studied quite carefully. This promises to be an effective means of linking up the work of the schools with the other agencies of social service.

S. E. Munson is Director of Research.

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